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Development, Implementation and Evaluation of a Culturally Adapted Cooking Curriculum to Address Dietary Acculturation and Food Security in a Refugee Population

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I am submitting herewith a dissertation written by Marissa McElrone entitled "Development, Implementation and Evaluation of a Culturally Adapted Cooking Curriculum to Address Dietary Acculturation and Food Security in a Refugee Population." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Nutritional Sciences.

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Development, Implementation and Evaluation of a Culturally Adapted Cooking Curriculum to Address Dietary Acculturation and Food Security in a Refugee Population

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DEDICATION

To Mom and Dad.
Thank you for your unwavering love, support and encouragement,
and for the gift of my ten best friends.

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ABSTRACT

Background: Sub-Saharan African refugees in the United States have reported food security (FS) rates up to seven times below the national average. Dietary acculturation (DA) issues have been noted as a contributing factor. However, there is no existing evidence-based nor are there any culturally tailored programs to address the unique DA barriers to FS for this population.

Methods: A four-phase, community-based curriculum adaptation process (information gathering [literature review, researcher informed, and formative research], preliminary adaptation design [data incorporation and steering committee], pilot testing [n=10 youth/adult dyads], and refinement) was applied to the existing evidence-based iCook 4-H curriculum using a five strategy (peripheral, evidential, linguistic, constituent-involving and sociocultural) cultural adaptation framework. In the first phase, the unique DA and FS experiences among Burundian and Congolese refugees were explored through semi-structured interviews (n=18). Next, these data were incorporated into the existing curriculum with the aid of a multilingual member of the priority population and a community-based steering committee (n=5). Finally, in the last two phases, the feasibility (recruitment/retention, implementation, fidelity testing, and dyad assessment procedures) and acceptability (process and program evaluations) of implementation and evaluation of the culturally adapted curriculum were measured.

Results: *Pika Pamoja* [*Cook Together*], an eight-session cooking curriculum for Burundian and Congolese refugee families, resulted. Adaptations were derived from varying combinations of the four data sources (literature review, researcher informed, priority population and steering committee), applying all five cultural adaptation strategies. Adaptations addressed the identified DA barriers and facilitators to FS including difficulty with language, cooking, shopping, and transportation; social network support; reliance and miscomprehension of nutrition assistance programs; and limited culturally relevant food access. All 10 dyads (control and treatment) were retained throughout the pilot testing. All fidelity measurements were 91% or above. Participant feedback was uniformly positive.

Conclusions: This study demonstrated a community-based cultural adaptation process that could be adopted to address DA and FS issues among various refugee populations. Based on these results, *Pika Pamoja* was feasible to implement and was accepted by the priority population. Larger scale studies to measure the effectiveness of *Pika Pamoja* to increase FS among refugee families are needed.

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CHAPTER I: Literature Review

Abstract

In recent years, worldwide surges in conflict have forced a record number of individuals to flee their homes in search of refuge elsewhere in their country or across borders. The United Nations High Commissioner for Refugees stated that over 68 million people were forcibly displaced by the end of 2017, with over 25 million deemed as refugees. Refugees are people fleeing their native country due to persecution or fear of oppression based on their race, ethnicity, religious affiliation, national origin, or connection to a particular political or social group. Refugees are resettled all over the world, including in developed nations such as the United States (US). Although characterized as a nation with abundant food availability, refugees resettled in the US have consistently reported low food security rates when compared to national averages, with the most vulnerable being those native to Sub-Saharan Africa. This means they do not have stable access to nutritious, safe foods to support a healthful life.

In addition to determinants such as limited income and difficulty with the English language, qualitative data have suggested dietary acculturation issues as a potential contributor to low food security in various refugee populations. Dietary acculturation refers to a transition in which refugees adopt the dietary habits, such as type of foods, consumption patterns and preparation practices of the new country of residence. Refugees have reported dietary acculturation difficulties with cooking, shopping, accessing and affording foods in the US. However, these findings varied among refugee groups and limited literature exists documenting the unique food security experiences of Sub-Saharan African refugees in the US.

This literature review was aimed to investigate the impact of dietary acculturation on the food security status of refugees resettled in the US, to provide an overview of the existing refugee-specific nutrition curricula, and to identify gaps in related research.

Defining Refugee

According to the United Nations High Commissioner for Refugees (UNHCR), there were over 68 million people forcibly displaced across the globe by the end of 2017.[1] This equates to nearly 45,000 men, women and children fleeing their homes every day due to conflict and persecution.[1] The UNHCR delineates individuals forcibly fleeing their homelands into the following categories based on where, when, and why they seek refuge: asylum-seekers, internally displaced, stateless people, returnees, and refugees.[2] Asylum-seekers are individuals who flee to a country, apply for asylum, and are waiting for their request to be processed by the country to where they have fled.[3] Internally displaced individuals are seeking refuge within their own country's borders.[4] Stateless people are denied a nationality which limits their access to education and employment.[5] Returnees may go back to their homes months or years after they have fled conflict or persecution; however this return does not always happen.[6] Lastly, refugees are people fleeing their native country due to persecution or fear of oppression based on their race, ethnicity, religious affiliation, national origin, or connection to a particular political or social group.[7]

The term refugee was first described under international law in 1951 by the United Nations Refugee Convention.[7] Refugees are both defined and protected under international law which protects them from being returned to unsafe situations in their country of origin.[1] This protection also includes asylum processing that is both just and efficient, and assurance of basic human rights while finding long-lasting refuge.[7] Many refugees seek protection across neighboring borders; however, those chosen and moved from the place of pursued safety to a third country, such as the US, undergo a process called resettlement.[8] Unlike persons permitted protection through asylum by reaching the US on their own, refugees are relocated through placement agencies after undergoing an intense vetting process.[8]

Refugee Resettlement in the United States

Refugee resettlement started in the US following World War II with more than 250,000 Europeans fleeing persecution.[9] After Congress signed the Displaced Persons Act of 1948, four hundred thousand more Europeans relocated across the Atlantic.[9] Further legislation in 1953 allowed admittance of refugees from various communist nations such as China, Cuba, Hungary, Korea, Poland, and Yugoslavia.[9]

With the admission of more than 100,000 Southeast Asian refugees, the Refugee Task Force of 1975 stimulated the modern refugee resettlement program.[9] Shortly after, Congress formalized the program in the Refugee Act of 1980, establishing the legality of the US Refugee Admissions Program (USRAP).[9] Presently this program is cooperatively operated through the Department of State (DOS), Bureau of Population, Refugees, and Migration (PRM); the Department of Health and Human Services, Office of Refugee Resettlement (ORR); the Department of Homeland Security, US Citizenship and Immigration Services (USCIS); the five PRM supervised international or nongovernmental organizations managing Resettlement Support Centers globally; and the nine nongovernmental organizations managing resettlement domestically through their 350 affiliated offices.[9,10]

The resettlement process begins when individuals register with the UNHCR in the country they are fleeing.[11] The UNHCR provides protection under international law, determines if the individual qualifies as a refugee, and works towards finding long term solutions such as a safe return to their home, relocation in the country to which they fled, or resettlement in a third country, like the US.[11] Most of the 25 million granted refugee status in 2017 will receive aid in the nation to which they escaped until returning safely home.[11] A small number of refugees will be granted citizenship in the nation they fled to and an even smaller number, approximately 1%, will be resettled in a third country.[11] After an arduous USRAP administered vetting process (usually taking 18-24 months) including interviews, security and health screenings, and cultural orientation, the US welcomes some refugees selected for third country resettlement.[10,11]

According to the DOS, 3 million refugees have been resettled in all 50 states since the initiation of the Refugee Task Force in 1975.[11] Historically, an additional

40,000 to 75,000 refugees are accepted annually, with approximately 40% of these individuals being children.[9] Due to escalations of global conflicts, the US admitted nearly 85,000 refugees in fiscal year 2016.[12] However, with presidential administration changes, the number of refugees resettled in the US has decreased to less than 25,000 in fiscal year 2018.[12] Several states in the South, including Tennessee, resettle refugees annually.[13] Bridge Refugee Services, Inc., the main resettling agency in Knoxville, Tennessee, resettled over 200 refugees in both 2016 and 2017.[9]

The term refugee is often mistaken for a homogenous group of people, but in reality, refugees resettled in the US arrive from diverse countries from all over the world. **Figure 1.1** describes the top five nationalities of refugees resettled to the US arriving in fiscal year 2018.[12] The largest number of refugees resettled in the US in the last year fled the Democratic Republic of Congo (DRC) (7,878).[12] This is followed by arrivals from Burma (3,555), Ukraine (2,635), Bhutan (2,228), and Eritrea (1,269).[12] Overall 47% of refugees resettled in fiscal year 2018 were from Africa.[12] Bridge Refugee Services, Inc., stated Sub-Saharan African refugees make up a large part of the refugee population resettled in Knoxville.[9] The largest populations of Sub-Saharan African refugees resettled in Knoxville are native to Burundi and DRC with lesser numbers from Somalia and Ethiopia.[9]

The Burundian and Congolese Refugee Experience

In 1972, many Burundians of Hutu ethnicity fled their homes in response to the ethnic cleansing efforts that were led by the Burundi Tutsi government.[14] Approximately 200,000 Hutu Burundians were killed between May and August 1972.[14] An additional 150,000 fled their native land for neighboring countries including Democratic Republic of Congo, Rwanda, and Tanzania.[14] For over thirty years, Burundians stayed and resided in refugee camps in these countries.[14] In 2007, permanent refugee resettlement of the "1972 Burundians" started in the US and other developed nations.[14] Many of the Burundian refugees resettled in the US either left their native country as very young children or were born in refugee camps in neighboring countries.[14] Although most of the Burundian refugees in the US are considered "1972 Burundians,"[14] the political unrest

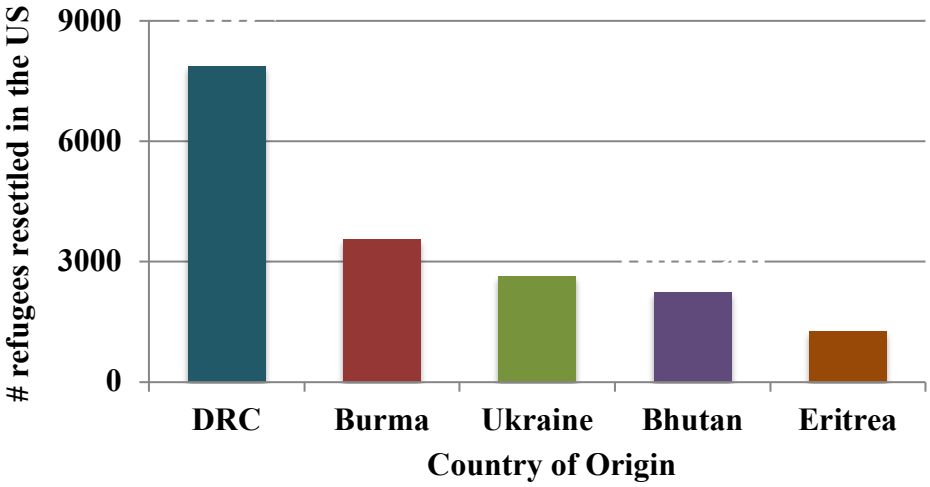

Figure 1.1 Top five countries of origin for refugees resettled to the US in fiscal year 2018[12]

escalating in the country in 2015 forced more than 400,000 to flee their nation.[15] Although most of these recent refugees are now residing in camps in Tanzania, Rwanda, and DRC some have been permanently resettled in countries like the US.[15] Loss of their homes, financial resources, and other material goods in combination with low literacy rates and limited jobs skills has made it especially challenging to adapt to life in the US for Burundians.[14,16]

Although the DRC has hosted Burundian refugees in current and past conflicts, its citizens have also endured over 20 years of unrest within their nation's borders.[17] In 1996, Rwanda invaded the DRC in pursuit of the 1994 Rwandan genocide perpetrators who took refuge in eastern DRC.[17] Then, the country endured the first and second Congo wars in 1996 and 1998, respectively.[17] Although a 2003 peace accord was signed, unrest, between and among armed groups and the central government, has persisted in the eastern regions of the DRC.[17,18] The current conflict in the DRC is complex and has spread to numerous and large parts of the country. Violence, human rights abuses, and war in the DRC have internally displaced 4.5 million Congolese and forced over 800,000 additional refugees to flee to neighboring countries.[18] Similar to the

Burundian refugee community, many Congolese have limited financial and material resources, low literacy rates in their native languages, low English proficiency, and limited jobs skills when they are resettled in the US.[17] The circumstances make it difficult for both Burundian and Congolese refugees to transition to life in the US, including obtaining and maintaining a food secure home.

Defining Food Security and Food Insecurity

Every year when refugees from diverse countries arrive in the US they have to adapt and learn about their new environment. Struggles with this adaptation have been linked to low food security outcomes.[19] The US Department of Agriculture (USDA) Economic Research Service monitors national and state food security trends and uses well defined terms to delineate food security and its varying levels among households.[20] The USDA states *food security* is "access by all people at all times to enough food for an active, healthy life."[20] Food security describes a household with current access and limited risk in losing adequate nourishing and safe foods for all household members. To be deemed food secure, three components including availability, access, and utilization must be met.[21] Food availability refers to having a sufficient supply of appropriate foods.[21] Food access refers to having adequate economic and other resources needed to access those foods. And lastly, food utilization or consumption is having adequate dietary intake and ability to absorb and metabolize nutrients effectively. Additionally, these three components must be stable over time for a household to achieve true food security.[21]

The USDA also defines *food insecurity* as "the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."[22] More recently the definition expanded, stating that if at any point during the previous year an individual experienced uncertainty in availability or ability to acquire foods ample enough to meet basic human needs, they are deemed food insecure.[23] Food insecurity is a household-level condition differing

from hunger, which is a physiological, individual-level status that may result from food insecurity.[22] This concept of hunger, previously included in the definition of food insecurity, was removed due to the difference in household versus individual measurements.

The USDA further granulated the terms food secure and food insecure in 2006 to describe varying degrees of severity of food insecurity.[22] These new labels, as seen in **Table 1.1**, are assessed using the same methods as the old labels allowing direct comparison with data collected prior to 2006;[22] however, the new labels removed hunger due to the conceptual differences between household food insecurity and individual hunger. Households with high food security (old label: food secure) have no reported food access issues or restraints; while marginal food secure (old label: food secure) households report one or two food insecure indications, generally derived from concern related to household food sufficiency.[22] While both "high" and "marginal" are terms used to describe food secure households, "low" and "very low" are terms to describe households deemed food insecure.[22] Low food secure (old label: food insecure without hunger) homes may report limits in diet quality, variety, and appeal, with little or no reduction in food consumption.[22] Lastly, very low food security (old label: food insecure with hunger) describes households reporting interrupted eating patterns and food consumption reduction.[22]

Table 1.1 USDA food security terms defined[22]

Term	Definition
Food security	Access by all people at all times to enough food for an active, healthy life
High food security	No reported indications of food-access problems or limitation
Marginal food security	One or two reported indications-typically of anxiety over food sufficiency or shortage of food in the house.
Food insecurity	The limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
Low food security	Reports of reduced quality, variety or desirability of diet. Little or no indication of reduced food intake.
Very low food security	Reports of multiple indications of disrupted eating patterns and reduced food intake.

Prevalence and Characteristics of Food Insecure Households Among Refugees in the US

When compared to the general population, refugees resettled in the US have reported much higher rates of food insecurity. In the 2017 report, USDA ERS stated that approximately 11.8%[24] of households in the US were food insecure, which was a decrease from previous years (12.3% in 2016,[25] 12.7% in 2015[26] and 14% in 2014[27]). However, refugees resettled in the US have consistently reported rates more than double the national averages.[28-34] Although estimates varied depending on the specific refugee population, nearly 25% of refugee households have reported food insecurity.[28-34] Even higher prevalence (up to 85%) has been documented among Sub-Saharan African refugees.[28-31,33] Based on these rates, Sub-Saharan African refugees appear more at risk for food insecurity compared to other refugee groups and the general US population.[24,28-34]

In addition to the higher prevalence among refugee households, other household characteristics, often found in resettled Sub-Saharan African refugee communities, are associated with higher rates of food insecurity compared to the general population. Households with children (15.7%), those headed by a single woman (30.3%), Black non-Hispanic households (21.8%), and households reporting below 185 percent of the poverty line (30.8%) were food insecure in 2017.[24] Additionally, food insecurity rates differ by geographic region in the US, with the highest rates in the South (13.4%)[24] where many refugees are resettled.[13] With refugee homes commonly fitting the characteristics of those with higher rates, it is important to further understand refugee susceptibility to food insecurity, particularly among those from Sub-Saharan Africa.

Health Outcomes of Food Insecurity Among Refugees

Food insecurity has been associated with negative health impacts across the lifespan and the USDA recommends assessing and addressing food insecurity at all ages across all populations and considers it a measure of overall well-being.[35] Food insecurity has been associated with decreased academic performance, impaired social skill development, and excessive weight gain in children.[36] Additionally, food insecurity

in adolescent and young adult populations has been linked to lesser academic achievement,[36] lessened social and mental well-being,[37] and decreased dietary quality.[38] In adults, food insecurity has been associated with increased odds of having arthritis,[39] diabetes,[39] metabolic syndrome,[40] stroke,[39] hypertension,[39] heart disease and high cholesterol,[39,41] and myocardial infarctions,[39] unhealthy dietary habits,[38] obesity[42-44] and limited social capital.[45]

Although literature exploring the relationship between food security status and health outcomes specifically among refugees is limited, some studies have documented negative health outcomes related to food insecurity among refugee communities.[28,32-34,46-48] Food insecure refugees may also have an increased risk of overweight and obesity than their food secure refugee counterparts.[33,46] For example, Cambodian refugees who reported higher past food deprivation scores (in their home country or in a refugee camp) were more likely to be currently overweight or obese than those with lower past food deprivation scores.[46] Additionally, Somali female refugees who reported food insecurity upon resettlement in the US, were more likely to have overweight or obesity compared to their food secure refugee counterparts.[33] Although only two studies have reported on the associations between food insecurity and weight status, others have explored changes in diet related to food insecurity. Reports of past food deprivation have been linked to increased consumption of high-fat meats and decreased consumption of whole grains among Cambodian refugees.[46] Additionally, current food insecurity in the US was associated with increased consumption of starchy cereals (Sudanese[32]) and general overeating (mixed[47]), and decreased consumption of dairy products (Liberian[27] and Sudanese[32]), vegetables (Burmese[48], Somalian,[33] and Sudanese[32]), and fruits (Burmese[48], Liberian,[28] and Somalian[33]) among refugees. Moreover, food insecure refugees may be more likely to experience depression, as evidence by a study that linked depression to food insecurity status among Cambodian refugees resettled in the US.[34] With various negative outcomes being more likely for refugees, it is important to properly assess food insecurity in this susceptible group.

Assessing Food Security

There is not a single indicator to thoroughly measure food insecurity; it must be calculated using an assortment of information including behaviors, occurrences, specific circumstances and respective levels of magnitude.[49] The USDA developed tools that measure various indicators of food insecurity by asking questions about household events, behaviors and perceptions towards food budgets, quality and quantity of food supply, and hunger.[50] The Household Food Security Survey Module (HFSSM) is an 18-item food security screener shown to have reliability and validity for measuring food security status and is the gold standard for measuring household food security.[50] This tool uses indicators to assess the three components of food security (availability, access and utilization) as well as stability of these components over time.[50] An additional abbreviated screener was developed from this gold standard to reduce respondent burden. This abbreviated screener is a 6-item short form of the HFSSM.[50] The USDA also developed a 10-item screener known as the Adult Food Security Survey Module (AFSSM) that is the gold standard for measuring food security status of adults without children.[50] Selection of the assessment tool is contingent upon the population, nature of the assessment and the research aims.

All three of the assessment tools described above use the responses to the core set of indicators to calculate a food security score.[50] This score is then further assessed using the food security scale to classify household food security status.[50] This linear scale gauges the severity of household food insecurity using values from 0 to 10, with 0 representing a household that has not experienced any conditions of food insecurity and 10 representing a household that has experienced all measured conditions related to food insecurity.[51] Researchers regularly employ one of these instruments when assessing food security in refugees, as well as in the general public.

Often before researchers use a food security assessment tool in refugee populations, they face validate the instrument in the refugee population of interest to test the degree to which the instrument subjectively appears to measure food security. Commonly, the tool is first tested with members of the target community.[33] In previous studies, researchers have asked community members to rate the question and answer

options on food security measurement tools using two criteria: (1) language use and clarity and (2) cultural relevance to the targeted refugee community.[33] The community member reviews inform revisions to the survey.[33] Additionally, some researchers have piloted the face validated tools in smaller scale studies before using the instrument in a large sample to ensure cultural relevance for the targeted refugee community.[29] Although many studies have completed face validation for cultural and linguistic relevance and clarity of food security assessment instruments, thorough validation of these instruments has not been completed among Sub-Saharan African refugee populations, which is a limitation to the research. However, many researchers use validated tools, such as the USDA HFSSM or its 6-item short form[50], and adapt them for their target audience without additional validation. These adapted food security assessment tools lead to a better understanding of refugee food security status; however, it is also important to explore the upstream factors potentially contributing to the high food insecurity prevalence found in this population.

Defining Acculturation & Dietary Acculturation

Acculturation is a process in which individuals adopt cultural norms of a dominant society and alter their native practices and behaviors.[52] Low levels of acculturation have been linked to low food security status among refugees resettled in the US.[19,29] For many refugees, acculturation begins in refugee camps and continues their entire lives after resettlement. Many lifestyle elements are altered during this ongoing process, one being the shift in gastronomy. Dietary acculturation is a transition in which immigrants adopt the dietary habits, such as type of foods, consumption patterns, and preparation practices of the new country of residence.[53] For many refugees arriving in the US, the Western food atmosphere presents major barriers to cooking (limited knowledge of nontraditional foods),[28,30,32,54] shopping (unfamiliar food choices and language barriers),[28,30] accessing (transportation issues),[54,55] and affording (limited economic resources)[28,30,32,33,54,56,57] a food secure home.

Impact of Dietary Acculturation on Refugee Health

Acculturation indicators, such as length of time in the US and English proficiency, have been connected to major long term health implications including increased risk of obesity and associated comorbidities such as diabetes and hypertension in resettled refugee groups.[58] Also, increased risk of heart disease and diabetes have been associated with resettlement related dietary shifts in refugees.[56] Moreover, refugees face difficulties attaining culturally appropriate care, resulting in delayed chronic disease screening and interventions.[59] Upon migration, refugees have lower prevalence of chronic disease than US natives, but over time chronic disease prevalence increases to that of the general population due to diet modifications and increases in sedentary routines.[60]

Additionally, refugee dietary changes reflecting their new residence have been shown to negatively impact some diet related health outcomes. Many refugees may experience periods of food insecurity prior to resettlement, but often consume more calories than needed upon arrival in the US leading to weight gain.[47] While some weight gain may be healthy for the undernourished, severe food deprivation experienced prior to resettlement has been linked to excessive rapid weight gain.[46] Additionally, high acculturation has been connected to increased risks of diabetes and hypertension, often related to less healthful diets and reduced physical activity levels in this population.[58] Acculturation scores were higher among African refugees who consumed greater amounts of sugary foods and beverages, and high fat foods, compared to those who did not consume as much of these types of foods.[54] Similarly, in a South Sudanese refugee population, an association was found between acculturation scores and consumption of fruits and vegetables, in that those with greater acculturation scores consumed fewer of both fruits and vegetables.[61] These results were also apparent in a study comparing the pre and post resettlement diet of Somali refugees as shown by increased consumption of processed and fast foods post-resettlement reflecting a dietary change.[62] Although higher acculturation scores have been linked with an increased risk for long-term non-communicable health complications, refugees reporting low acculturation scores, often in those early years after resettlement, may be more susceptible to food

insecurity.[28,30,32-34] With various negative outcomes for refugees, it is important to properly understand and assess dietary acculturation in this population.

Assessing Dietary Acculturation

A variety of methods and scales measure overall acculturation and dietary acculturation in refugee populations.[19,29,63-65] In epidemiological health studies, a multi-dimensional approach is most commonly used to score many aspects of acculturation such as cultural beliefs, values, and language dexterity in both native and new tongues.[66] Commonly shown in refugee studies in the US, acculturation proxies such as length of residency and aptitude in the English language are often used to measure acculturation levels.[28,19,30,32-34,63] The use of acculturation proxies, although consistently associated with various health indicators such as food security status,[19,33,63] has come under recent scrutiny and deemed inadequate when measuring the complexities of refugee dietary acculturation.[65,66] For example, studies that use time lived in the US as a proxy, may not take into account refugees resettled and living in enclaves that may reduce the rate of acculturation due to the continued community emphasis on traditional customs and practices in their communities. Variation in acculturation definitions, theories, and lack of measuring specific acculturation domains have been noted in literature as a weakness in many public health acculturation studies.[67]

An alternative method that researchers have used to measure acculturation involves measuring indicators specific to the acculturation domain of interest. Some researchers investigating dietary acculturation used quantitative scales to capture pre to post migration dietary changes.[68,69] Generally, these linear scales indicated higher levels of dietary acculturation corresponded with lower values on the scale.[68,69] The 2003 New Immigrant Survey Round 2 (NIS-2003-2),[70] a longitudinal study of a nationally representative sample of newly arrived immigrants to the US, includes a dietary acculturation scale ranging from 1-10 that researchers often used to measure dietary acculturation.[68,69] A value of 10 on this dietary acculturation scale indicates no change in diet from pre to post migration where a value of 1 indicates a complete change.[70] Previous research has defined low dietary change as values 7-10; moderate

dietary change as 5-6; and high dietary change defined as values 1-4.[68,69] Although measuring dietary acculturation is an important indicator of dietary change it does not account for individuals with bi-cultural skills who choose to consume traditional foods to reduce chronic disease and increase connections with cultural traditions, nor does it measure refugees' perceived difficulties in the dietary environment, which are both vital for relevant intervention development.

It is imperative to investigate difficulty in the food environment and how this relates to food security and dietary acculturation statuses, specifically in the refugee population. Based on previous research[54] and the formative work of Hadley and Sellen (2006),[28] a food difficulty index was develop to measure refugees' difficulty navigating the food environment.[30] This 4-item index includes questions regarding shopping, cooking, and food preferences.[30] Reponses include agree or disagree and all affirmative answers receive a score of 1. All affirmative responses are summed and scored between 0 and 4 with higher values indicating more difficulties in the food environment.[30] This food difficulty index was used in a diverse group of refugees from the following countries: Sierra Lone, Liberia, Ghana, Somalia, Togo, Turkey, and Georgia; however, the instrument's validity is limited since researchers conducted only faced validation before use.[30]

Although assorted tools are used to score acculturation and dietary acculturation, there are no gold standards or validated tools specific to measuring these variables in Sub-Saharan African refugee populations. Researchers have suggested that tailored qualitative approaches[71] may be beneficial to investigate and improve understanding of dietary acculturation among refugees groups from diverse countries.[30] It is important to measure various indicators of both acculturation and dietary acculturation to comprehensively investigate the impact of these variables on the food security status in the refugee population.

Dietary Acculturation & Food Security Status Among Refugees

Dharod and colleagues (2013) studied associations between food insecurity, diet, and body mass index (BMI) among female Somali refugees in *Food insecurity: Its relationship to dietary intake and body weight among Somali refugee women in the US.*[33] This cross-sectional study recruited a convenience sample of 195 Somali women refugees through snowball sampling methods.[33] The participants met the following criteria to qualify for the study: Somali female, living in Lewiston, Maine, mother of a child 12 years or younger, and primary meal preparer in the home.[33] More than half of the sample (56%) reported living in the US for 3 years or less.[33] Interviews, conducted by trained bilingual interviewers, took place in participants' homes.[33] Applying standard anthropometric protocol, investigators recorded participant heights and weights.[33]

Surveys, previously used with immigrant populations,[72,73] were first reviewed for survey development. The final survey included three major domains in this study: socioeconomic and acculturation factors, dietary intake, and food security.[33] Socioeconomic factors were investigated with variables including household size, income, education, and participation in government food assistance programs. Acculturations factors were measured with two proxies commonly used in previous refugee populations including length of time in the US and English language competence.[28,19] A short food frequency questionnaire (FFQ), adapted from a tool previously found reliable with low-income Latino families,[74] assessed dietary intake. The FFQ asked participants to estimate how often (per day/week/month) foods including grains, beans/lentils, meats, eggs, dairy, starchy vegetables, green leafy vegetables, other vegetables, and fruit were consumed. Discussion group results from a previous study conducted with Somali refugees[62] informed the specific food examples for each of the food groups. The 10-item validated Radimer/Cornell Hunger Scale,[75,76] scored from 0 to 10 (food secure: 0, household-level food insecure: 1-4, adult-level food insecure: 5-7; or child hunger: 8-10)[76], was used to assess food security status.[33]

Next, the trained interviewers reviewed the first draft of the survey to test for face validity.[33] Three interviewers rated each question and answer options using 2 criteria

including: (1) language use and clarity, and (2) cultural relevance to the Somalians.[33] After reviews, suggested changes were discussed and final consensus informed any final revisions to the survey.[33] A pilot study (n=35) was conducted prior to this study to established face validity of the entire instrument.[29] Additionally, trained field workers collected height and weight measurements from each participant.

All data analysis was completed using SPSS 17.[33] A power analysis to detect differences in fruit and vegetable intake frequency between food insecure and secure women was estimated at 210 participants (195 individuals completed the study).[33] Descriptive statistics and bivariate tests including chi-square and t tests were used to detect any differences between food secure and insecure groups and the prevalence of socioeconomic and acculturation factors.[33] In addition, a multinomial logistic regression model inspected the association between food insecurity and diet. This logistic regression model had the independent variable (dietary intake) coded as an intake of less than 1 serving per day (0) versus intake of at least 1 serving per day (1); food secure was used as the reference category for the multinomial dependent variable, food security status.[33]

Additionally, BMI was calculated using the average of two height and weight measurements and categorized into standard groups: underweight <18.5; normal weight 18.5-24.9; overweight 25.0-29.9; or obese $\geq$30.0.[77] Frequencies were calculated to describe the BMI distribution in the sample.[33] Dichotomous logistic regression, with forced entry, was used to investigate the effect of food security, socioeconomic and acculturation factors on BMI (reference: normal weight as 0; comparison: overweight/obese as 1).[33]

Approximately 67% of refugees reported food insecurity[33], more than 5 times the national average.[24] This food insecurity prevalence was similar to previous studies with other Sub-Saharan African refugee populations from Liberia, Somali, Sierra Leone, Ghana, and Togo estimating ranges from 50 to 85 percent.[28-32,78]

In addition to lower monthly income ($p<0.001$), the study showed lower acculturation indicators such as English skills ($p=0.03$) and shorter length of stay in the US ($p<0.001$) were associated with food insecurity.[33] These acculturation indicators

have been noted as risk factors for food insecurity in other studies with Sub-Saharan African refugee populations. Liberian refugees reported a decrease in food insecurity as the length of time in the US increased.[19] Furthermore, studies with Sub-Saharan African refugees have shown an increase in food insecurity rates among those reporting lower English proficiency.[28,56,63] Results also revealed that food insecurity was positively associated with overweight and obesity (p=0.01). This study displayed that food insecurity is a major issue faced by Somali refugees and mirrors results found from other work with various Sub-Saharan African refugee groups. In addition to better understanding acculturation proxies (length of time in US and English proficiency) as risk factors for food insecurity it is important to further investigate the relationship between specific dietary acculturation concerns in Sub-Saharan African refugee populations and food security status.

In *Acculturation, economics and food insecurity among refugees resettled in the USA: a case study of West African refugees,*[19] Hadley and colleagues (2007) assessed rates of food insecurity, its relative severity, and its relationship to dietary acculturation indicators in West African refugees resettled in the US.[19] This research started with months of qualitative ethnographic data collection including informal and detailed refugee interviews, participant observations at health meetings, talks with a community nurse and social worker, and a pilot study.[28] Use of service based convenience-sampling methods via resettlement organizations, Women Infant and Children (WIC) nutrition assistance programs, religious factions, and snowball-sampling approaches recruited the non-probability sample of 101 Liberian refugees.[19] The participants met the following criteria to qualify for the study: 18 years or older, female with a child 5 years or under, resided in the US for less than 4 years, and declared Liberia as her birth country.[19]

Female West African interviewers conducted interviews in English and the national language of Liberia, at baseline and at a 6-month follow up in refugee homes.[19] Interviewers received previous training throughout the pilot study.[28] A standardized interview instrument gathered data including information regarding resettlement record, household socioeconomic status and structure, food assistant program participation,

shopping and language difficulty, and an evaluation of household food insecurity.[19] Based on the validated USDA food insecurity scale,[50] researchers produced a culturally sound instrument tailored to the sample to gauge the household food security status from baseline to 6-month data collection.[19] This adapted tool categorized households as food secure, mildly food insecure, or severely food insecure.[19] In addition, using a continuous measurement, the device calculated the severity of food insecurity.[19]

In addition to assessing food security, the researchers created a 6-item scale based on the qualitative data collected in the early stages of the project to assess dietary acculturation.[28] Based on responses to six questions regarding shopping, the calculated scale scored answers as “agreed” or “disagreed” and then combined responses to formulate a comprehensive dietary acculturation score.[19] The internal consistency of the dietary acculturation scale was adequate (Cronbach’s alpha: $\alpha=0.73$); therefore, responses to the 6 items were aggregated into a final score.[19] Other acculturation measurements including self-reported English proficiency, length of time in US, income, employment, and participation in food assistant programs were collected.[19]

Qualitative transcripts were entered in an unnamed qualitative analysis software program to investigate emerging themes.[19] Three themes surfaced from the qualitative data including causes, coping, and consequences of food insecurity.[19] It was found that relative to refugee household income, expensive bills in America and often decreasing food expenditure was the only perceived option to cope with lack of money.[19] Many refugees reported sending money to their families in Liberia limiting their personal spending budgets.[19] Numerous participants reported changes in places they shopped, the amount of food they purchased, and the volume of food their families ate due to limited finances while in the US.[19] In addition to the qualitative findings, the quantitative data were also explored for associations between food security status and acculturation indicators.

Using SPSS 11 to evaluate quantitative descriptive data, researchers compared groups (food secure versus food insecure) using chi-square and Wilcoxon two-sample tests.[19] Spearman test investigated associations between continuous variables and the food security scale.[19] From baseline to follow up, 53% of households reported food

insecurity at some point during those 6 months.[19] From this 53%, 37% of households felt mild food insecurity and 16% experienced severe food insecurity.[19] Reported monthly income of less than $1000 (p=0.013) and unemployed primary caregiver (p=0.035) were found to relate to food insecure households.[19] Refugees that struggled with language were more likely to report severe food insecurity than those reporting comfort with the English language (p=0.021).[19] High dietary acculturation scale scores (representing lesser dietary acculturation) were linked with overall food insecurity (p=0.038) and severe food insecurity (p=0.009).[19] A negative association was found between period in the US and food insecurity (p<0.001) and severity (p<0.0001).[19] For those in the US less than 12 months, 73% were food insecure while 33% of those living in the US for at least 36 months reported food insecurity[19], which is over three times the national average.[24]

Lastly, a multivariable regression investigated possible independent predictors of food insecurity.[19] This regression model used acculturation, as a single variable comprised of responses to dietary acculturation scale, language proficiency, and time in the US due to the collinearity of these variables. This single acculturation variable was created using principal components analysis.[19] The multivariate regression model showed that household size (p=0.04) and the acculturation variable (p=0.02) was a positive and independent predictor of food insecurity while income variables were not significant (p>0.05).[19] This studied showed an association with lower time in the US and food insecurity.[19] Although rates declined over time, there were still more than a third of refugees reporting food insecurity after 3 years in the US showing the population's susceptibility to food insecurity when compared to the general population.[24] The relationship between low acculturation status and food insecurity may indicate acculturation as a predictor for food security status.[19] A pilot study conducted by the same researchers exhibited similar results linking food insecurity and parallel risk factors, but to an even greater degree with 85% of households experiencing food insecurity.[28]

Hadley and colleagues (2010) later published on similar findings from a cross-sectional study of 281 refugees originating from Georgia, Ghana, Liberia, Sierra Leone,

Somalia, and Togo.[30] The study participants were recruited through a local resettlement agency.[30] Additionally, using snowball-sampling methods, each participant was asked to recommend another person who met the inclusion criteria (≥18 years of age and refugee status).[30]

As described in the acculturation and dietary acculturation assessment section, the researchers used a food difficulty index, developed from previous findings,[28,54] to measure refugees' difficulty navigating the food environment.[30] This 4-item index includes questions regarding shopping, cooking, and food preferences, with responses including agree or disagree, and all affirmative answers receive a score of 1. Affirmative responses are aggregated and scored between 0 and 4 with higher values indicating more difficulties in the food environment.[30] This food difficulty index faced validated before use.[30] Additionally as seen in the previously mentioned study by the same group[19], food security status was measured using the validated USDA 6-item short form[50] and tailoring it for cultural appropriateness and to assess household food security status on 6-month intervals.[30]

Using SAS 9.1 to evaluate quantitative data, univariate analyses were used to describe the sample, and chi-square tests and Spearman's correlations were used to investigate bivariate relationships.[30] Furthermore, a logistic regression was used to model probability of food insecurity with a set of covariates (sex, income, English proficiency, length of time in US, education, food difficulty index score). Lastly a Generalized Estimating Equation (GEE) was used to model the probability of food insecurity in cases were observations were not independent (people living in the same home).[30]

Assessing dietary acculturation difficulties, 46% of refugees reported issues with shopping and 63% claimed hardship regarding cooking in their latest atmosphere.[30] Plus, lower acculturation scores regarding the new food environment were associated with higher levels of food insecurity in the surveyed population ($p<0.05$).[30] Similarly, difficulties with new food environments, language, and shopping are noted in Bhutanese refugees in the US.[57] Lastly, unlike the 2007 published outcomes[19], no significant

association between duration of resettlement in the US and food insecurity was found ($p>0.05$) in this particular population.[30]

Aggregated findings from these studies clearly showed refugee populations are more susceptible to food insecurity than the general public, with highest rates observed in Sub-Saharan African refugees.[28-32] Additionally, certain acculturation proxies such as English proficiency and length of time in the US seem to predict food security status in most cases.[19,33,57] Also, difficulty in the food environment or difficult with the dietary acculturation process seems to be linked to higher prevalence of food insecurity in refugee populations.[30,57] These aggregated findings warrant further investigation into the causes and consequences refugee food insecurity, specifically in the most vulnerable Sub-Saharan African populations, and calls for exploration of potential intervention strategies to mitigate this issue.

Refugee Health & Nutrition Programs

Existing Refugee Health & Nutrition Programs

Refugees admitted into the US receive assistance upon arrival including cash and medical assistance for the first 8 months, case management services, English as a Second Language classes, work readiness training, and job placement services.[79] The ORR offers a variety of programs for refugees including programs focusing on health. Programs on emergency preparedness in the US as well as prevention programs through the Refugee Health Promotion Program have been developed to address refugee specific health needs including health literacy, affordable health care access, and health and emotional wellness services.[80]

The ORR has also developed a few health promotion programs to meet health needs of specific refugee groups. A video series, entitled *Stories of Hope from Bhutanese Refugees: Moving from Distress to Wellness,* was developed through a partnership with the ORR, mental health professionals, and the Bhutanese community

to address the high prevalence of emotional stress documented in this resettled refugee population.[80] Another video series, *Somali Refugee Women: Learn about your Health,* was created for Somali refugee women focusing on reproductive health, prenatal care and pregnancy, diet and exercise, and cancer screening.[80] Congolese health experts, women's health advocates, and the Congolese refugee community collaboratively developed a video series on the US healthcare system, prenatal care, pregnancy, and reproductive health, and gender based violence called *Getting and Staying Well for Congolese Refugees*.[80] However, no ORR programs or materials focus specifically on dietary acculturation or difficulties in the new food environment.

In addition to materials developed by the ORR, the US Committee for Refugees and Immigrants (USCRI) has developed culturally and linguistically appropriate health and nutrition resources for resettled refugees.[81] The Healthy Living Toolkit focuses on common health issues experienced by refugees such as asthma, breast cancer, childhood obesity, cold and flu, dental health, domestic violence, the US healthcare system, and family planning.[81] To address refugee nutrition, healthy eating patterns, and physical activity the USCRI developed Healthy Eating Flip Chart.[82] Some of the printed materials and video series were designed for specific refugee populations showing the importance of tailoring interventions in a culturally and linguistically specific way. Refugees resettled in Knoxville, Tennessee have access to these nationwide health and nutrition resources and are often given these materials by the local resettlement agency, Bridge Refugee Services, Inc.[9] Additionally, this local agency provides case managers who aid refugees with healthcare, public services, housing, school services, employment programs, and English classes.[9] However, both the nationwide and local existing programs, materials, and video series do not address food insecurity or dietary acculturation issues many refugees, especially those from Sub-Saharan Africa, experience upon resettlement in the US.

Cultural Adaptation of Nutrition Programs for Refugees

Nutrition programs for refugees have been an increased topic of interest over the last decade. Understanding the need for culturally and linguistically appropriate

programs has launched curriculum adaptations to fit the specific needs of refugee populations from diverse countries across the nation.[83] The USDA Food and Nutrition Outreach (FNO) program first launched a social marketing campaign to communicate the dietary guidelines for Americans to refugees.[84] The marketing campaign used needs assessment data to generate nutrition messaging specific to particular groups of people. However, due to limited resources is was not feasible to address all the socially and culturally diverse refugee populations in the US, ending this outreach strategy.[84] The FNO program then shifted from social marketing campaign to a personal empowerment behavioral change model for nutrition outreach programs for refugees.[84] The personal empowerment model is based on the idea that people change behavior by gaining knowledge, attitudes, and skills centered on their own perceived needs.[85] The behavioral change model calls for a more individualized form of intervention acknowledging individual belief systems impacting dietary choices.[83] Researchers and other nutrition program developers have used personal empowerment as a framework for nutrition education in refugee populations in the US.

The current literature does not show use of personal empowerment in nutrition programing for Sub-Saharan African refugees; however it was previously used in a Vietnamese immigrant population for nutrition curriculum adaptation.[83] This study adapted and implemented five California Expanded Food and Nutrition Education Program (EFNEP) curriculum modules to be culturally and linguistically appropriate for their priority population.[83] The first step of the curriculum adaptation was revising and rewriting the modules in Vietnamese.[83] Some research has shown nutrition education materials in the native language and the appropriate literacy level of the priority population were most effective.[86,87] Two bilingual Vietnamese-American nutritionists translated the modules into Vietnamese and culturally relevant terminology was incorporated.[83] The revised modules included drawings of traditional nutrient-dense Vietnamese foods, discussed traditional Vietnamese food practices, and provided traditional Vietnamese foods as examples of specific nutrient sources.[83] The revised modules incorporated dietary acculturation issues such as purchasing, storing, and preparing American foods from each of the food groups discussed.[83] Additionally, using

the personal empowerment framework, the module revision reinforced healthy aspects of the traditional diets while incorporating unfamiliar Women Infant Children (WIC) foods into native dishes.[83] The revised modules were then tested on a group of WIC eligible Vietnamese immigrant mothers.[83]

Non-English speaking, WIC-eligible, Vietnamese women, who were either pregnant or had a child up to 3 years old were eligible for the study.[83] Nutrition education assistants (NEAs), from the local communities completed recruitment for the study.[83] Participating counties hired these bilingual Vietnamese-American NEAs from their local communities and provided training on basic nutrition information and teaching methods before program implementation.[83] NEAs used WIC, EFNEP, community programs, health departments, and housing authorities to recruit participants.[83]

The study used a 24-hour food recall and EFNEP Family Record demographic form translated into Vietnamese.[83] Due to the illiteracy of many of the participants, they could not record food intake; therefore the 24-hour food recall was used.[88] The NEAs were trained to administer the survey during a pilot testing.[83] The piloted survey was revised and additional probing questions were added for this study.[83] NEAs conducted the initial survey administration via interview at the participants home in Vietnamese.[83] Nonrandom group assignment into the treatment or control group followed the interview. NEAs taught the culturally and linguistically adapted nutrition education modules to the treatment group, either individually or in small groups of 2-6 participants usually at a participant's home. NEAs facilitated discussion, shown to be an effective learning tool for people with limited English proficiency[87] , between participants. Additionally, the use of bilingual, bi-cultural facilitators has been noted as an effective strategy to facilitate discussion.[87] Sessions lasted for 90 minutes, were held once per week, and NEAs administered at least 5 sessions to each participant.[83] At the completion of the nutrition education sessions, the NEAs administered the survey instrument again.[83] NEAs told the control group they were on a waiting list for the intervention.[83] Approximately six to eight weeks after the first survey administration, NEAs collected survey data again from the control group participants.[83] Following this period, the NEAs administered a delayed

intervention to the control group; however, any data collected after this delay was not used in the study.[83]

All the data were entered into SPSS (unspecified version) statistical software to explore differences between treatment and control groups using 2-sample t tests, two-sample Wilcoxon, chi-square, and Fisher's exact tests.[83] Matched-pair t tests were used to investigate changes over time in nutrient intake within both treatment and control groups. Additionally, to look at possible differences of nutrient intake over time (used as the dependent variable) between groups an analysis of covariance was used (nutrient intake at baseline used as covariate).[83] To investigate any changes over time in the consumption of servings of food groups, a McNemar tests was used to explore within group differences and a chi-square test was used to detect any differences between groups.[83] The results showed over time, treatment participants who reported consuming at least one serving from each food group ($p<.01$) and consuming the recommended number of servings from each group ($p<.05$), significantly increased compared to the control group.[83] Additionally, when compared to the control, the treatment participants reported a significantly improved nutrient density of calcium, riboflavin, vitamin B6, and potassium.[83] Although this study found some positive results using culturally and linguistically adapted materials, and bilingual, bi-cultural NEAs, some key strategies suggested for the development and implementation of targeted and tailored nutrition programs were overlooked.

Various strategies have been suggested to achieve more targeted and tailored health programs including peripheral, evidential, linguistic, constituent, and socio-cultural adaptations.[89] Peripheral adaptions include culturally appropriate program materials that reflect images and experiences of the priority population.[89] Evidential adaptations enhance perceptions of the health issue relevance in the target group through related data.[89] Offering linguistically appropriate materials includes both dominant language and emic terminology.[89] Constituent adaptations include involving the priority population in all aspects of the program from assessment to evaluation.[89] And lastly, sociocultural adaptations to health programs promotes discussions in an appropriate context including the group's value and characteristics.[89] To better address

dietary acculturation and food security issues in Sub-Saharan African refugee populations, the development and implementation of programming with both culturally and linguistically tailored curriculum and facilitators is important. Additionally, involvement from the targeted community throughout the development, implementation, and evaluation stages are warranted.

Community-Based Research with Refugees

The strategy of constituent adaptation of nutrition programs to better suit the needs of specific priority populations is often employed in both programmatic and research settings. In Community-Based Participatory Research (CBPR), a commonly used constituent technique, community members are equal partners with academic researchers in defining the problem, collecting information, interpreting data, and developing solutions in pursuit of socially relevant outcomes.[90,91] CBPR has been shown to increase the likelihood of effective program implementation, evaluation and sustainability.[92] Community members are recognized as experts in their own right and their knowledge is equally valued as is academic expertise.[93] CBPR teams have shown established relationships of co-learning involving sharing power, capacity, skills, and knowledge,[94, 95] with both the process and the outcome emphasized.[96]

In health programming, CBPR is a partnership approach to research involving the community, organizations, key stakeholders, and researchers. All share equitability in all parts of the research process and decision-making, all partners provide their own unique expertise, and all have equal ownership.[97] The aim of CBPR is to expand the knowledge and understanding of a particular phenomenon while integrating the knowledge gained with interventions, policy, and social change to improve the health outcomes of community members.[97]

According to Israel and colleagues (2013) there are nine guiding principles of CBPR; however, use of these principles needs to be unique to each collaboration.[97] Members of the CBPR team need to collaboratively decide which principles are applicable for their collective vision and decision making structures.[97] These principles state that CBPR:

1. recognizes community as a key element of identity
2. builds on existing community strengths and resources
3. facilitates a collaborative and equitable partnership in all research phases including empowering and power-sharing processes to address social inequalities
4. fosters co-learning and capacity building among all partners
5. integrates and achieves a balance between knowledge generation and intervention for the mutual benefit of all partners
6. focuses on the local relevance of public health problems and on ecological perspectives that attend to the multiple determinants of health
7. involves systems development using a cyclical and iterative process
8. disseminates results to all partners and involves them in the wider dissemination of results
9. involves a long-term process and commitment to sustainability

In addition to the guiding principles of CBPR, there are seven core components or stages vital for conducting CBPR.[98] These components may be carried out in sequential order at times, but the overall process is cyclical and some components may be engaged during the entire CBPR process.[98] **Figure 1.2** depicts these core components. The first component, *form a CBPR partnership*, includes identifying the key partners and community members to be part of the partnership.[98] In this stage researchers need to build relationships, trust, equity, power sharing, and establish an infrastructure for the research process with all members of the CBPR team.[98] The second component, *assess the strengths and dynamics of the community*, involves exploring the community's resources, culture, history, affiliated organizations, leaders, and key community members.[98] *Identify health priorities and research questions* investigates major health issues impacting the target community that the CBPR partnership could address, ways to identify and prioritize these health issues, contributing factors, and research questions the study intends to explore.[98] Next in the *design and implement etiological interventions/research* phase, the CBPR team decides

the appropriate research design, data collection, intervention strategies, and implementation methods for their community.[98] The fifth component, *get feedback and interpret the findings*, the research team shares the findings from analyses and engages all CBPR partners in the interpretation of the findings.[98] The sixth phase, *disseminate and translate findings*, the CBPR team decides which findings are the most important to share, the best ways to disseminate, role of partners in publishing results, and ways to translate and integrate findings into broader interventions.[98] Lastly, *maintaining, sustaining, and evaluating the CBPR partnerships,* is depicted in the center of **Figure 1.2** signifying that this ongoing component is at the center of all the other phases and is incorporated throughout each.[98] Continuous investigation into how the partnerships are working, how they can be improved, and how can they be sustainable are addressed in this component.

CBPR is an approach to research and not an actual research design or methodology.[97] Many of the components described above are often incorporated into various research approaches; however, the emphasis on involving diverse partners throughout the entire process, through equitable participation, ownership, and co-learning is unique to CBPR approach.[97] Due to this goal, it is important for researchers to take the proper steps to establish trust, power-sharing, and foster co-learning between all parties, especially when they are from diverse backgrounds.[97]

Academic researchers, often from outside the targeted CBPR communities, tend to have different characteristics then their CBPR partners.[97] These differences in race, ethnicity, education, socioeconomic status, and culture may potentially weaken the equity, trustworthiness, and power sharing of the CBPR relationships.[99] To create solid partnerships from the beginning, researchers must be equipped with proper awareness, knowledge, and skills to work in multicultural settings.[97]

Successful CBPR researchers engage in the concepts of cultural safety and cultural humility in preparation and throughout the research process.[97] *Cultural safety*, first defined for the nursing context in New Zealand,[100] is a policy giving community members the power to express their personal feelings of risk and safety to researchers.[97] Taking into account how worldview, language, and other cultural factors

influence CBPR relationships, partnerships practicing cultural safety can improve trust and feelings of safety in the collaboration.[100] To build cultural safety in CBPR partnerships it is important to: set decision making procedures requiring all members to voice their opinions; emphasize open-mindedness; consider the influence of social and historical contexts on the status quo; create a partnership that anticipates conflict and addresses differing opinions through the community-developed decision making protocols throughout the entire process.[100]

Cultural humility requires commitment to continually self-reflecting and self-critiquing one's own intentional and unintentional biases, addressing power imbalance, creating and sustaining mutually beneficial community partnerships.[101] Cultural humility involves knowledge, attitude, and skills.[99] Researchers need knowledge of social determinants of health and health inequities.[99] Also, self-awareness of attitudes such as conscious and subconscious stereotyping, bias, and privilege is vital.[99] Lastly, researchers need skills regarding communication, ability to identify power imbalances, and skill to promote decision making and power-sharing.[99]

Achieving cultural safety and humility are reflected throughout each of the CBPR principles.[97] The use of these concepts emphasizes the major role the community plays in the process and points out the importance of relinquishing the researcher's role as the expert.[97] The integration of CBPR principles, core components, and cultural safety and humility has been an effective approach with vulnerable populations such as refugees.[102] Specifically, CBPR has been used for nutrition and physical activity programming in diverse populations and communities including refugees living in the US.[102]

In a study including Somali refugee women, CBPR was used to develop, implement, and evaluate a socioculturally appropriate nutrition and physical activity intervention.[102] Twenty-nine recruited women participated in a fitness retreat informing the development of the intervention.[102] The retreat included seven diverse fitness demonstrations and various nutrition themes taught in a variety of teaching styles.[102] At the end of the retreat, the 29 women participated in two focus groups focusing on their preferences of the fitness and nutrition education delivery.[102] Probing questions were

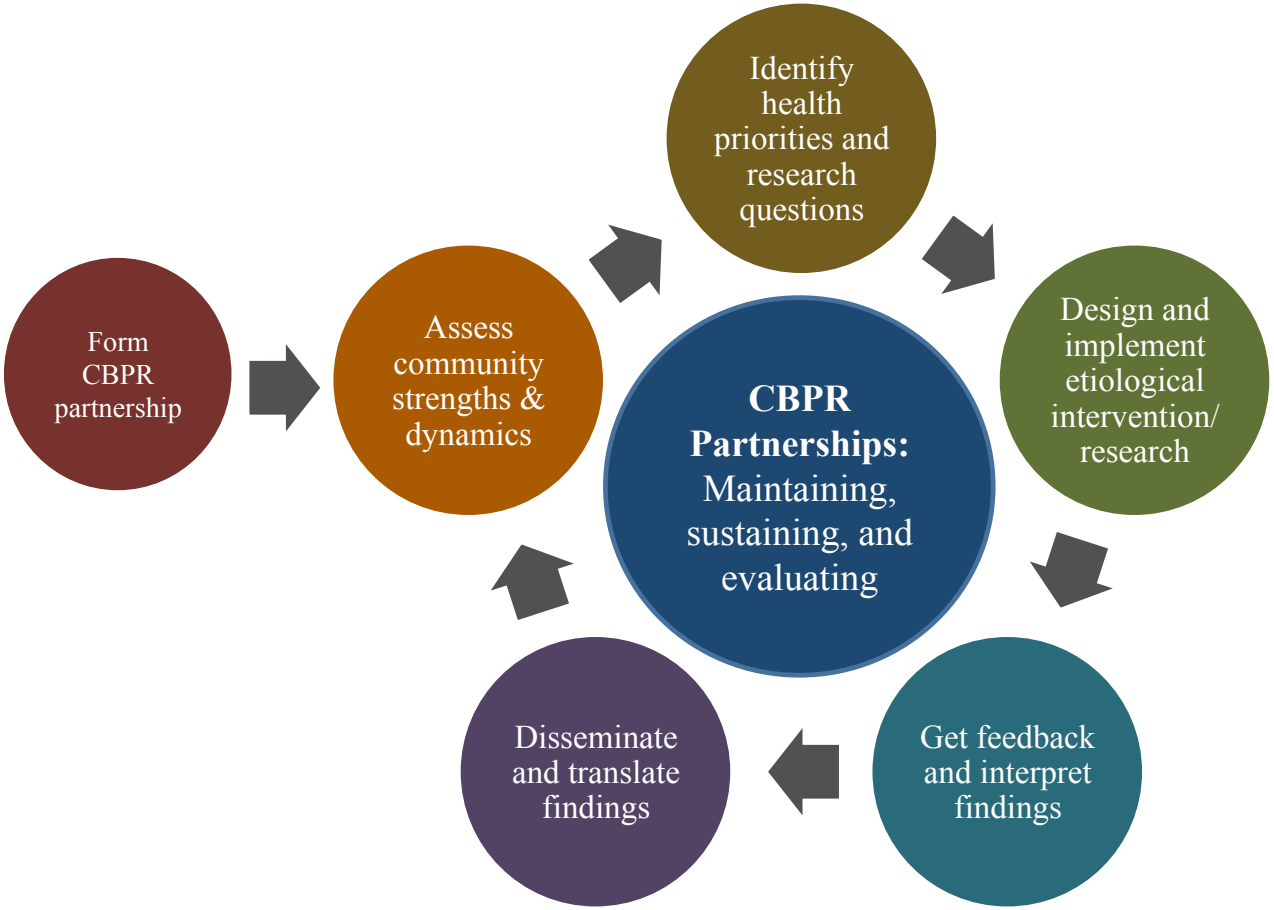

Figure 1.2 Core components for conducting Community-Based Participatory Research[98]

Source: Israel BA, Coombe C, McGranaghan R. (2010)

asked regarding the cultural relevance of the demonstrations in addition to the participants' time, location, and other logistical program preferences.[102] The focus groups were conducted by trained facilitators, digitally recorded, transcribed, and entered into a qualitative analysis software program, NVivo8 for coding and analysis of themes.[102] The results of this formative research, informed the development and implementation of the program.[102]

The nutrition and physical activity program was then piloted with 45 women, recruited by word of mouth through community members.[102] The program included two classes per week, offered childcare and transportation, and provided healthy snacks and beverages.[102] The pilot program was evaluated in various ways including attendance logs, pre- and post- and post-only surveys administered face-to-face with the aid of professional interpreters as needed.[102] Post-only evaluation included the use of the validated Physical Activity Class Satisfaction Questionnaire (PACSQ).[103] Pre- and post- intervention evaluations included a previously validated health-related quality of life assessment tool,[104] two 3-point Likert-type scale questions regarding self-efficacy, and questions involving type, time, and intensity of exercise to measure fitness behaviors. All evaluations were face validated with members of the community prior to implementation. Additionally, trained anthropometric measurers collected pre- and post-BMI, waist circumference, and blood pressure of all participants.[102]

Pre- and post- intervention data were analyzed using t-tests or Fisher's exact test.[102] Evaluation results indicated high acceptability (4.85 out of 5 on the PACSQ) of the physical activity classes.[102] Also, participants were more likely to engage in regular exercise (<0.001), and reported higher health-related quality of life (P<0.001) and after the intervention.[102] As an integral piece of CBPR, the results were then shared with the community and partners via a community meeting.[102] The results and next steps were discussed at the meeting regarding the program outcomes and future.[102] The results of these studies warrant the adaption/development, implementation, and evaluation of curriculum in a culturally, linguistically, and socially relevant way for Sub-Saharan African refugees, while involving members of the community throughout the entire

process; however, no literature regarding CBPR approaches to programs focused on food security and dietary acculturation issues in this population have been found.

Although this CBPR model presents a list of guiding principles and core components to follow, complete adherence to the model is very challenging, if not impossible.[105] Researchers conducting CBPR with any communities, including refugee groups, face numerous obstacles making it difficult to adequately address all the CBPR criteria.[105] It can be difficult to identify participants who truly represent the community of interest rather than representatives of special interest groups.[105] Additionally, achieving equitable community participation in all research phases is very challenging.[105] For example, in CBPR the community should be given the opportunity to identify and select the health issue; however, researcher expertise and funding priorities often dictate the topics selected for the research.[105] Moreover, the nature of complex statistical analysis and data interpretation often limits the community contribution in the data analysis process.[105] The CBPR model is also very time-consuming, which may barriers for academics to fully engage in the partnership building process.[105] In reality, unadulterated CBPR may rarely be achieved, but studies have found that conducting community-based research guided by CBPR principles benefits communities.[106-108]

Theory in Nutrition Programming for Refugees

In addition to using CBPR approaches, nutrition programming for Sub-Saharan African refugees often includes a theoretical framework. The Social Cognitive Theory (SCT) is the theoretical base for many interventions involving refugees. Developed by Albert Bandura, SCT is an interpersonal level theory frequently used in human research.[109] It emphasizes the dynamic and reciprocal relationship between people and their personal factors, their behaviors, and their environments.[109] Uniquely, SCT emphasizes the power of social influence on human behavior and explains the role of social reinforcement, both externally and internally.[109] SCT looks at the individual, how they individually procure and continue a behavior, while also looking at the environment in which they present that particular behavior.[109] Additionally, SCT considers a person's past experiences and how these may influence behavior.[109] Many health programs

focus on behavior initiation but do not address behavior maintenance; however, a goal of SCT is to enforce behavior maintenance over time.

Through *reciprocal determinism*, these personal, behavioral, and environmental factors interact by influencing and being influenced by each other in a dynamic and reciprocal way.[109] Using this reciprocal determinism framework, the central concept of SCT, many health programs target a combination of these factors aiming to change a particular health behavior.[109] In addition to this key SCT concept, health programs often use various combinations of other SCT components as part of their program.

Some other important constructs of SCT include: behavioral capability, observational learning, reinforcements, self-control, expectations, and self-efficacy.[109] *Behavioral capability* is having the essential knowledge and skills to actually perform a behavior.[109] A person must know what to do and how to do it before actually performing a behavior.[109] People learn from their past experiences and consequences of particular behaviors also effecting their environment in which they live and perform behaviors.[109]

Observational learning involves watching and observing the outcomes of other individuals performing a desired behavior.[109] This construct assumes when people witness other conducting a behavior they can then reproduce that same behavior.[109] Often carried out through modeling, observational learning can result in successful completion of a desired behavior after a person watches another individual successfully complete the same desired behavior.[109]

Reinforcements involve incentives encouraging behavior change.[109] These incentives may be internal or external responses to a person's behavior that in turn affect either the continuation or discontinuation of the particular behavior.[109] Reinforcements can either be positive or negative and can be self-initiated or in the environment.[109] This particular SCT construct demonstrates the reciprocal relationship between behavior and environment.[109]

Self-regulation is the idea of personal regulation of goals directed towards a particular behavior change. [110] Self-regulation is often exhibited through opportunities such as self-monitoring, goal setting, problem setting, and a self-reward system.[110] Use of these self-control strategies are often seen in various health programming.[110]

The SCT construct of *expectations* refers to the anticipated consequences of a particular behavior.[109] Anticipated consequences may influence behavior engagement and successful completion.[109] Outcome expectations are often derived from past experience.[109] Additionally, the person's individual value, expectancy, placed on the expected outcomes influence behavior engagement and completion.[109]

One of the newer SCT constructs is self-efficacy. *Self-efficacy* is an individual's belief in one's self to execute a behavior.[110] It refers to an individual's confidence level in their ability to effectively do a desired behavior.[110] An individual's specific capability, other personal factors, as well as environment factors such as barriers and facilitators can all effect self-efficacy.[110]

Although SCT is used in various health related programming with Sub-Saharan African refugee populations there are some noteworthy limitations to the theory. SCT assumes environmental change will undoubtedly lead to individual change although this is not always the case.[109] Additionally SCT is based on the dynamic and reciprocal relationship between people, behavior, and the environment; however, the extent and degree to which these factors influence behavior compared to the other factors influence is not well defined.[109] Also, with a focus on learning process, SCT disregards biological and hormonal components with the potential to effect individual behavior.[109] Minimal consideration of an individual's unique emotions or motivation is regarded expect for the influence of past experiences.[109] Also applicability of all the SCT constructs of to one public health problem may be difficult especially in developing targeted intervention. Generally, health and nutrition programs use various combinations of SCT components when developing targeted programs for diverse populations rather than using the theory in its entirety.

A nationwide program that regularly employs SCT is 4-H, which is run through the Cooperative Extension System and USDA.[111] 4-H has been offering youth development programming for over 100 years and is recognized as a world leader in developing youth to become productive citizens and catalysts for positive change to meet the needs of a diverse and changing society.[111] From its inception, cooking and food preservation were part of the agricultural focus of farming and raising livestock.[111]

The 4-H mission to empower youth to reach their full potential, working and learning in partnership with caring adults is now targeted to both rural and urban youth.[111] There are three mission mandates: 4-H Science, Youth in Action and Healthy Lifestyles.[111] Youth are encouraged to develop habits, including healthful eating and being physically active, that lead to healthful lifestyles that can be maintained into adulthood.[111]

Research-based Extension educational experiences are offered to 4-H members from 5-19 years old who “learn-by-doing” activities that stimulate skills for living and lifelong learning.[111] Youth gain knowledge, develop skills, and form positive attitudes to prepare them to become capable, responsible and compassionate adults.[111] Youth-adult partnerships are essential for successful, positive youth development to occur.[111] Youth interact with caring adults and peers, creating a positive family-like support system that includes the youth-adult relationship and the extended family within the community, state and nation.[111] Adults model leadership and volunteerism for youth. Inherent in the 4-H model are the constructs of the SCT, developing behavioral capacity and self-efficacy through observational and participatory learning and being in a reinforcing environment.[111]

Additionally, 4-H models involving youth-adult dyads may be an avenue for future effective refugee nutrition programming. Studies have noted children have an increased exposure to new foods and cooking methods through media, school, and various peer outlets when compared to their adult caretakers.[54] Findings from a qualitative study with Sub-Saharan African refugees reported some adult refugees were unaware of where to shop and how to cook certain American foods they like; however, the familial youth had this knowledge and skillset.[54] Using 4-H dyad models has not been previously used to address dietary acculturation issues in Sub-Saharan African refugee populations but may be warranted in future studies.

Research Limitations

While these studies show significant associations with dietary acculturation related issues and food insecurity in refugees, specifically Sub-Saharan Africans, there are some limitations worth noting. Although often based on validated tools, the scales and measurements utilized to evaluate both food security and acculturation levels vary widely from study to study; frequently, due to the variance in the populace's culture and customs. Researchers commonly compile pieces of validated materials to better serve their priority populations. Since this practice is observed regularly in acculturation and food security reports, exploration into development and validation of culturally adaptable tools and scales, specific to refugees' country of origin, may lead to expansion of current knowledge basis.

With small sample sizes, restricted access to newly arrived refugees, and priority populations often consisting of singular nationalities, these findings lack generalizability for refugees across the US. Research with larger sample sizes, consisting of numerous refugee nationalities, is critical for enhanced generalizable results. Additionally, experimental attrition may skew potential variability in regression models as seen by Dharod and colleagues (2013) with completion rates lesser than the suggested power analysis calculations. Reasonable and proportionate incentives may increase participant completion rates in future studies. Lastly, these non-experimental research designs, customarily employed in this type of data collection, do not allow for any causal deductions. It may be beneficial to implement an intervention program aimed at refugee acculturation difficulties and assess its effects on food security status. Although quasi-experimental designs are often deemed inferior to randomized control trials in terms of causal inferences and internal validity, with the ability to investigate longitudinally, they may lead to a better understanding of the ongoing process of refugee acculturation. With assorted methodology, use of diverse and invalidated tools, lack of generalizability, and restrictions on population access it is difficult to conclude the strength of the relationship between acculturation and food insecurity in refugees resettled in the US.

Gaps in the Literature

Although dietary acculturation and food security have become a more popular topic in recent years, there is still very little known about the impact it may play on Sub-Saharan African refugee populations. As the largest newly arrived refugees, with the highest rates of food insecurity, understanding the unique dietary acculturation needs of Sub-Saharan African refugees and possible interventions to mitigate those issues is needed to improve food security status in this population. The literature did not yield any nutrition programming developed specifically for this population addressing their unique dietary acculturation problems. A program that simultaneously focuses on increasing skills with shopping and cooking in the US with limited financial resources to address food insecurity and promotes long-term healthful dietary patterns and lifestyles to reduce chronic disease is needed for this population. Additionally, there is very little research regarding adaption of nutrition curriculum specifically for Sub-Saharan African refugees focusing on improving food security by addressing dietary acculturation issues in the population.

Conclusions

Although measurements, methodology, and populations slightly varied, all studies exposed important results regarding dietary acculturation and food insecurity in refugee populations. Refugees reported food insecurity rates more than double the national average[26], with the highest rates found in the Sub-Saharan African population. Additionally, refugees reported struggles with the new food environment in the US including shopping, language barriers, limited access and high cost of culturally appropriate foods, budget management, and issues with unfamiliar cooking methods and equipment. Collectively, lower scores on acculturation and dietary acculturation scales were significantly associated with higher rates of food insecurity in refugee populations. A better understanding of dietary acculturation in refugee populations, its

effect on food security status, and ways to mitigate perceived issues in the new food environment, is warranted to improve the food security of refugee populations, especially in the most vulnerable Sub-Saharan Africans.

Although the impact of dietary acculturation on food security in refugees resettled in the US has become an increasingly studied subject, few programs exist to address these specific issues. Focusing on population specific dietary acculturation issues reported by Sub-Saharan African refugees is a possible way to improve their food security status. Studies focused on developing, adapting, implementing, and evaluating nutrition programming addressing dietary acculturation issues to fit the cultural and linguistic needs of this susceptible refugee group, Sub-Saharan Africans, is needed to address and improve their food security status.

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CHAPTER II: Barriers and Facilitators to Food Security Among Adult Burundian and Congolese Refugee Females Resettled in the US

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Abstract

Background: Sub-Saharan African refugees in the United States have reported food security rates seven times below the national average. Dietary acculturation issues may be a contributing factor to these low food security rates.

Objective: Identify the perceived dietary acculturation barriers and facilitators to food security among Burundian and Congolese refugee females living near a mid-sized city in the Southeastern region of the US.

Methods: A criterion-specific sample (n=18) was recruited through local refugee programs using network then snowball sampling methods. Semi-structured interviews and demographic surveys were facilitated with the aid of a culturally and linguistically appropriate interpreter and documented through audio-recordings and extensive fieldnotes. An iterative, two cycle coding analytic process was completed within NVivo 11. First cycle eclectic and second cycle pattern coding were applied to 16 transcripts

by two coders who sought inter-rater reliability. Codes were organized into hierarchical maps and coding matrices for direct content analysis, and pattern and theme detection. Saturation, defined as no new emerging themes, was achieved and validated with an additional two interviews.

Results: Participants, with a mean age of 33.9 years (SD±11.84), were primarily Burundian (67% vs. 33% Congolese), married (72%), held no high school degree (72%), unemployed (56%) and reported limited English proficiency (72%). Length of time in the United States ranged from 12-137 months. Barriers and facilitators to food security across all levels of the Socio-Ecological Model (SEM) were noted. Emerging themes included difficulty with language, cooking, and shopping; transportation; social network support; orientation services; reliance on nutrition assistance programs; limited culturally relevant food and land access; and program policy miscomprehension.

Conclusion: The complex relationship between dietary acculturation barriers and facilitators at various SEM levels demonstrates the need for a multi-level intervention to improve food security among refugees.

Introduction

In recent years, worldwide surges in conflict have forced a record number of individuals to flee their homes in search of refuge elsewhere in their country or across borders.[1] The United Nations High Commissioner for Refugees stated that over 68 million people were forcibly displaced by the end of 2017, with 25.4 million deemed as refugees.[1] Refugees are people fleeing their native country due to persecution or fear of oppression based on their race, ethnicity, religious affiliation, national origin, or connection to a particular political or social group.[2] Refugees are resettled all over the world, including developed nations such as the United States (US). Although characterized as a nation with abundant food availability, refugees resettled in the US have consistently reported low food security rates when compared to national averages.[3-10]

In the most recent 2017 report, the United States Department of Agriculture (USDA) estimated low rates of food security, "access by all people at all times to enough food for an active healthy, life",[11(p2)] among 11.8% (15 million)[11] of US households. However, nearly 25% of diverse refugee groups have reported this household condition.[3-10] Moreover, Sub-Saharan African refugees seem to be more susceptible with up to 85% of documented households lacking food security.[3-7,9] Based on lower rates, Sub-Saharan African refugees appear to be more vulnerable to food security compared to other refugee groups.[3-7,9]

In addition to determinants such as limited income[3,6,8,9] and difficulty with the English language,[6,8,9] qualitative data has suggested dietary acculturation issues as a potential contributor to low food security in various refugee populations.[3,4,6,12,13] Dietary acculturation is a transition in which refugees adopt the dietary habits, such as type of foods, consumption patterns and preparation practices of the new country of residence.[14] Refugees have reported dietary acculturation difficulties with cooking (limited knowledge of nontraditional foods),[3,6,8,15] shopping (unfamiliar food choices and language barriers),[3,6] accessing (transportation issues)[15,16] and affording (limited economic resources)[3,6,8,9,15,17,18] foods in the US. However, these findings varied among refugee groups and limited literature exists documenting the unique food security experiences of Sub-Saharan African refugees in the US.[3,4,6,12,13]

To help fill this gap in literature, this study was designed to identify the perceived dietary acculturation barriers and facilitators to food security among female Burundian and Congolese (the predominant Sub-Saharan African refugee population in the city of interest)[19] refugees living near a mid-sized city in the Southeastern region of the US. This formative research study, which collected and analyzed qualitative, semi-structured interviews, was used to inform intervention development in a later phase of a larger community-based research study.

Methods

Data Collection

A criterion-specific sample (n=18) was recruited predominately by word-of-mouth through existing, local refugee programs using network then snowball sampling methods.[3,4,9,20,21] Participants meeting the following inclusion criteria were invited for an interview: female, 18 years of age or older, self-reported refugee status, and native of a Sub-Saharan African country. Since primary meal preparers in the priority population are typically female, the study included only women.[7] Participants were not excluded based on any other criteria. All participants gave written informed consent and were given $25 gift card incentives for the approximately 30 to 45-minute interview.[22] Interviews were conducted privately at the participants' convenience and preferred location (often the participant's home), and were documented through audio-recordings and extensive fieldnotes.[20-24]

Using a grounded theory approach, the data collection protocols were designed and conducted through a constant comparative method.[24] The semi-structured interview guide, touching on topics found in previous studies with similar populations[3-9,12,13,15-18,25] aimed to explore perceptions of specific dietary acculturation barriers and facilitators to food security experienced by female Burundian and Congolese refugees living near a mid-sized city in the Southeastern region of the US. Interviews included a series of open-ended questions, listed below, exploring interviewees' post resettlement food security experiences regarding: (1) culturally familiar food access; (2) food shopping; (3) transportation to food outlets; (4) meal preparation habits and cooking methods/equipment; and (5) government nutrition assistance programs. Questions included in the semi-structured interview guide were:

- Tell me about foods you like to eat.
- What foods do you like from your country?
- What American foods do you like to eat?
- Tell me about finding you like or are familiar with in the United States?

- Tell me about your experience shopping for food in the United States?
- Why do you choose to shop at certain grocery stores or other food markets for your food?
- Tell me about your experience buying foods at stores in the United States.
- Discuss your experiences using money in the United States to buy food.
- Tell me about your experiences with transportation to and from grocery stores and other food markets?
- Discuss your experiences cooking here in the United States?
- Discuss your experiences using new cooking methods or tool in the United States?
- Tell me about your experiences with food programs (food stamps, WIC, school lunch, etc.) in the United States?
- Is there anything else you would like to share with me today?

The interview guide also included basic sociodemographic questions such as age and native country of origin, and acculturation indicators such as length of time in US and self-perceived English proficiency. Three members of the target refugee community (not included in the study) were interviewed using the initial interview guide to test for wording, content and cultural relevance.[21] Suggested revisions such as reduce word count and simplify words like “purchasing” to “buying” were incorporated into the final interview instrument. The Principal Investigator (PI) conducted all interviews with the aid of a culturally and linguistically appropriate interpreter, who translated from English to the interviewee’s preferential language (Swahili or Kirundi) and vice versa.[20,27(pp168-169)] The multilingual interpreter provided interpretation for both languages.

Socio-Ecological Model Framework

Food security among refugees is a multifactorial issue influenced by interacting individual, social and environmental dietary acculturation factors. The Socio-Ecological Model (SEM) is often used to explore multilevel influencers and their reciprocal

causation on individual health behaviors and outcomes, such as food security.[27,28] Use of the SEM framework was not an a prior in this study, rather it emerged throughout the data analysis process. The SEM model developed by McLeroy and colleagues[29], adapted for use in this study, provided a comprehensive framework to organize identified barriers and facilitators to food security. In addition to the five levels of influence described in McLeroy's SEM model (intrapersonal, interpersonal, organizational, community and policy) [29], a sixth level of influence, household, was added to the model. This adaptation was used to investigate differences between relationships and processes between immediate family members and other social groups. The socio-ecological approach guided data analysis to improve the understanding of the dynamic and complex connections between factors affecting food security among interviewed refugee women.

Data Analysis

Researchers used a multi-stage, iterative data-driven analysis process to identify patterns and themes.[30-32] In the first stage, interviews were transcribed and uploaded to NVivo (Version 11; QSR International Pty Ltd., 2018) for storage and organization. Next, the PI cross-checked all transcripts for accuracy using audio-recordings, then reviewed with the translator. Then, after reviewing transcripts from the first 16 interviews,[20,31] the research team discussed and collaboratively developed data-driven codes and an initial codebook, which were revised iteratively as necessary.[31-32] This codebook was then used to provide a guide for coding responses, to serve as documentation of code content descriptions, and to analytically organize codes into major categories and subcategories.[31-32] To minimize coding inconsistencies, the research team developed protocols for coding, memo writing and annotations.[30] Periodically, the research team met to discuss, review and evolve codes and the codebook as analysis progressed.[30] Prior to coding, the research team measured Inter-Rater Reliability (IRR) within NVivo using a proportion of agreement calculation.[31] All coders were required a reliability of 80% agreement or better on each code to ensure maximum coding consistency.[31]

In the second stage of analysis, multiple rounds of first cycle, eclectic coding was manually applied to transcripts by two coders who sought IRR.[30] During the first cycle coding process, new concepts without an initial code definition were labeled as *other*. The research team discussed all concepts coded as *other,* and developed and revised codebook as needed. Before second cycle coding, the research team used code mapping and code landscaping to reorganize and refine codes developed from first cycle processes.[30]

Using the updated codes and codebook, in the third stage of analysis, the same two coders completed second cycle pattern coding (applying the appropriate SEM level code) to the 16 transcripts with a third master coder (PI) used in cases of coding discrepancy to limit analysis bias.[22] Codes were organized, categorized, and assembled into hierarchical maps and matrices for direct content analysis, and pattern and theme detection.[32] Preliminary analyses were completed to determine whether saturation, which in this study was defined as no new emerging themes, was achieved.[31] Following all previously outlined procedures, an additional two interviews were conducted, transcribed, and coded to validate saturation.[20] A final IRR measurement was calculated for each code using proportion of agreement (>92% on all codes) and Cohen's kappa coefficient (k=0.84) indicating a strong level of agreement between coders.[31] Descriptive statistics were calculated in SPSS (Version 24.0; IBM Corporation, 2016).

Results

Descriptive Statistics

Semi-structured interviews were conducted between December 2017 and February 2018 in the homes of participants, extended family members and neighbors. Sample characteristics of participants are summarized in **Table 2.1**. Participants (n=18) were all female, with a mean age of 33.9 years (SD±11.84), were primarily Burundian (67% vs. 33% Congolese), married (72%), held no high school degree (72%) and unemployed (56%). A majority of the households participated in government assistance

Table 2.1 Demographic, socioeconomic and acculturation indicator characteristics of participants (n=18)

Characteristic	Categories	n (%)	Mean (± SD)	Range
Participant				
Sex				
	Female	18 (100)	-	-
Age (years)				
		-	33.9 (± 11.84)	18-64
Country of Origin				
	Burundi	12 (67)	-	-
	Democratic Republic of Congo	6 (33)	-	-
Adult Marital Status				
	Married	13 (72)	-	-
	Not Married	5 (28)	-	-
Education Level				
	< High School Degree	13 (72)	-	-
	≥ High School Degree	5 (28)	-	-
Employment				
	Employed	8 (44)	-	-
	Unemployed	10 (56)	-	-
Limited English Proficiency				
	Yes	13 (72)	-	-
	No	5 (28)	-	-
Length of time in US (months)		-	67.1 (± 47.86)	12-137
Household				
Participation in government assistance programs (income proxy)				
	Yes	17 (94)	-	-
	No	1 (6)	-	-
Number of children in house		-	3.9 (± 2.74)	0-11
Number of adults in house		-	2.3 (± 0.69)	0-4
SD indicates standard deviation				

programs (94%) and had a mean of 3.9 (SD±2.74; range 0-11) children and 2.3 (SD±0.69; range 0-4) adults living in the house. The majority reported limited English proficiency (72%) and the mean length of time in the US was 67.1 months (SD±47.86) ranging from 12-137 months. Although all participants were not originally resettled in the same US locations, at the time of interviews, all were currently residing near the mid-sized city in the Southeastern region of the US.

Major Themes Across the Socio-Ecological Model

The barriers and facilitators to food security from the perspective of 18 Burundian and Congolese women who were resettled in the US as refugees were noted across all levels of the SEM as depicted in **Figure 2.1**. Each of the six circles on the SEM represented the corresponding level of influence, from intrapersonal to policy. The white arrow represented the interconnected and reciprocal relationship of factors at all levels of the SEM. Facilitators perceived to increase food security were mapped across the left half of the SEM, while barriers perceived to decrease food security were mapped on the right.

Intrapersonal

The intrapersonal level encompassed characteristics affecting an individual's behaviors, including personal knowledge, skills, attitudes, beliefs, and self-efficacy.[33]

Importance of English Language Proficiency

All the refugee women indicated lack of English knowledge and skills as a barrier to food security upon resettlement in the US. When asked about shopping for preferential and familiar foods, one Burundian refugee (age 37 years) stated "when we arrived in the US we didn't speak English. English was very difficult to understand and to speak. It was difficult to communicate with people. That was a problem."

Although lack of English proficiency was a universal barrier upon arrival, the women who resettled during childhood reported improved food security with the development of more language skills, regardless of duration in the US. In contrast, women resettled during adulthood reported persistent difficulty with English as continual barrier to food security. A Burundian (age 24 years), resettled in childhood, said "I use

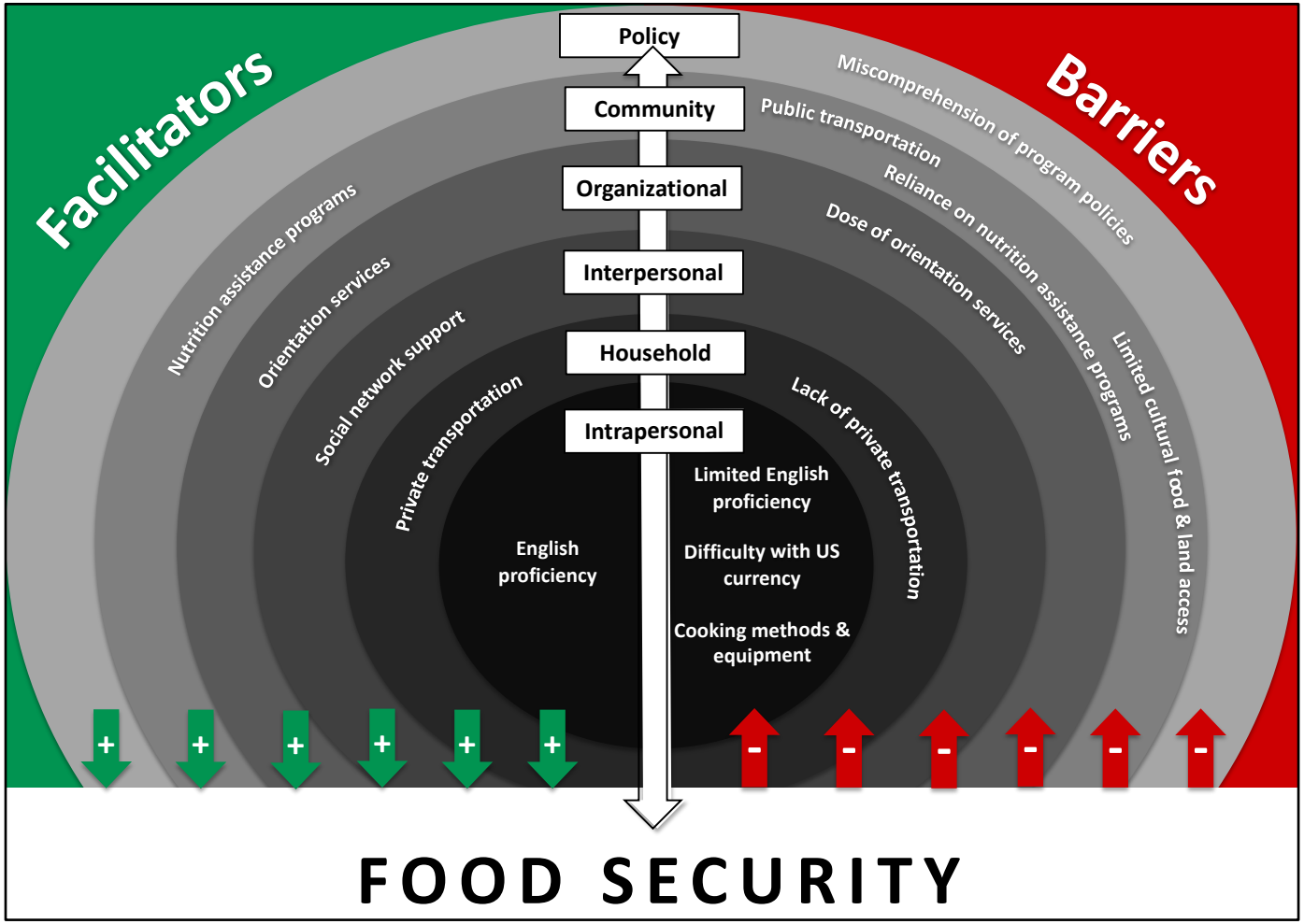

Figure 2.1 Conceptual map of perceived barriers and facilitators to food security among adult Burundian and Congolese refugee females across the Socio-Ecological Model

Adapted from the McLeroy and colleagues' SEM (1988).

different equipment like crockpots. I cook rice and beans in the crockpot. Since I know how to read and write, I read the instructions from the box on how to use it" showing improved English skills as a facilitator to food security. While another Burundian refugee (age 34 years) resettled in adulthood, said "when signing up for the programs [USDA nutrition assistance programs] at the office, it was very difficult. Until now, it is still difficult and very confusing because of language." Although both women have been living in the US for over 8 years, the refugee resettled as an adult indicated her persistent difficulties with English as a continuous barrier to food security.

Unfamiliar Cooking Methods and Equipment in the US

Many of the participants indicated their unfamiliarity with cooking methods and equipment in the US as a barrier to food security. Although all the women mentioned their orientation included tutorials on various cooking equipment commonly used in the US, many expressed not knowing how to use the equipment after their caseworker left. For example, a Burundian refugee (age 37 years) reported that "In Africa I used to cook on charcoal or sometimes firewood, but in the US the stove was new to me. [The] case manager showed me how to reduce [the heat], and to turn on and off the stove. When we forgot how to use it we would stop eating." Additionally, some of the participants mentioned shifts in their cultural norm due to unfamiliarity with cooking methods and equipment in the US affecting their food security. A young Burundian woman (age 18 years) recalled, "I didn't cook until 2 years from when I got to the US. I didn't start cooking until I turned 12. That was when my mom let me get close to the stove because she was scared. She was scared because I was short. Before I came to the US I cooked in Africa because I got used to it, what she showed me. But right here [in the US] I didn't know...It was different that I didn't cook here because I wanted to help my mom, but I couldn't."

Along with unfamiliarity with cooking methods and equipment, women reported a lack of knowledge and skills specifically related to cooking American foods. Many women reported this deficit as a major barrier they wished to overcome. "I don't know how to cook American food, and I want to know how to cook American food. I have never had someone show me how to. I want to learn to cook American foods, but I don't

know the names of the foods that I like or want to learn to cook" said a Burundian refugee (age 28 years) expressing her desire to learn to cook American cuisine.

Difficulties Using US Currency

Another reported intrapersonal barrier to food security was difficulties using US currency when food shopping. Although some Congolese women mentioned using US bills in their native countries, the majority of participants expressed difficulties with US coinage. For example, a Congolese refugee (age 29 years) stated, "Now, I know how to count US bills, but I still don't know how to count the US coins. Like small coins, like pennies and dimes are difficult. I don't know how to use them. Or when I get them back from the cashier, I don't know what they are." A few participants expressed extreme difficulties using US currency forcing them to put their trust in the cashier to count and return the appropriate change. One Congolese refugee (age 33 years) stated, "When I use US money, I go to the store, pick up the food and go to cashier but I don't know how much money I am supposed to give them. Even now, I don't know how much to give the cashier. So, I just gather all the money I have and hand it to the cashier to count the money. I still don't know how to count money. I just give all the money to customer service [cashier]. I don't know which is a penny or which is a nickel…I just give them [cashier] the money and hope they give the correct change back to me."

Household

At the household level of influence, dietary acculturation factors affecting immediate family members were explored. Main household level findings focused on transportation.

Private Transportation Access

Transportation was a major theme reported across multiple levels of the SEM. At the household level, private transportation access of an immediate family member was reported as a facilitator to food security providing ease to and from food outlets and USDA nutrition assistance program appointments. When lacking, this private transportation access was noted as a major barrier not only for personal transport to and from, but also transporting groceries purchased at food outlets. A Burundian woman (age 34 years) stated "It was a very difficult situation because when I wanted to

go to buy food from the store, I would keep my baby on my back and walk by foot. And then I would bring the food back home with my hands. Sometimes I would use a cart, put my food in a cart and push the food home in the cart."

Additionally, when referring to private transportation access, many described a then versus now situation. A majority of the refugee women reported transportation barriers upon resettlement but expressed feelings of relief when private transportation was added to their households. When talking about her experiences traveling to food outlets in the US, a Burundian refugee (age 37 years) reported "[then, upon resettlement] I didn't know what to do. Now we have blessings with a car. We have transportation, but before it was very hard."

Interpersonal

The interpersonal level was applied to factors involving extended family, friends, peers, caseworkers and other social networks.[33]

Social Network Support

Whether participants were discussing their extended families, friends, fellow refugees, neighbors, volunteers or church members, a major theme mentioned in all the interviews was the importance of social networks and social support on achieving food security. Many expressed the importance their social networks played in teaching them to use new cooking equipment in the US. A Congolese refugee (age 26 years) recalled, "[A Burundian refugee volunteer] taught us how to use the stove. That guy showed us everything like how to use microwave and other cooking equipment." Also, when private household access was lacking, social networks often supported transportation to food outlets. A Burundian (age 37 years) said, "we had volunteers take us from the apartment to the grocery store." Social networks even played a role in locating culturally familiar foods. A Congolese participant (age 30 years) told interviewers, "The neighbors, they were from the same religion, they showed me where to get the food I liked here."

Organizational

The organizational level included rules, regulations and policies influencing behavior from entities such as churches, stores and other community organizations.[33]

Orientation Services

Regardless of resettlement location, all participants discussed their experiences and knowledge gained through orientation services when they first arrived in the US. Orientation services, offered through various resettlement agencies, were noted as valuable facilitators to food security; however, many participants noted forgetting information provided in the sessions. When talking about information received at their initial orientation services in the US, a Burundian woman (age 24 years) said, “We [her family] had issues with food stamps [Supplemental Nutrition Assistance Program (SNAP)] because we couldn’t remember how to swipe or use the pin number. Sometimes we would go to the grocery store and couldn’t remember our pin number and we would have to call our caseworker to remind us what the pin number was.”

Community

The community level accounted for publicly available community resources as well as norms and practices of the larger refugee community.[33]

Difficulty with Public Transportation

Transportation, a major theme at the household level, was reported as a barrier to food security at the community level. Difficulties using public transportation often led to walking far distances to food outlets due to confusion about bus schedules, missed buses and sometimes waiting for long periods of time in inclement weather. When describing her experiences traveling to food outlets, a Burundian participant (age 24 years) said, “We didn’t know how to take the bus anywhere, so we had to walk to the grocery store to get some food and something to eat.” Another Burundian woman (age 37 years), who described confusing bus schedules stated, “When we missed the bus we walked by foot, my husband and I. The worst time was in the winter, it was very cold, and I was pregnant.”

Reliance on Nutrition Assistance Programs

All the participants reported using USDA nutrition assistance program(s), such as the SNAP, free or reduced school meals, and/or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), either at the time of the interview (n=17) or in the past (n=1). Perceived as a major facilitator, nutrition assistance

programs played a key role in the food security of the interviewed refugee women. In some cases, nutrition assistance programs were reported as the sole income source for food purchases. Describing the economic resources she uses for major expenses, a Burundian woman (age 55 years) said, “I have been using food stamps to buy food. Cash money was for rent. Sometimes the caseworker would give us checks to buy cleaning supplies.” Although providing an important safety net for refugee families, overreliance of nutrition assistance programs as the sole source for food is potentially a barrier to longer term food security. Many interviewed participants provided similar comments such as one Congolese refugee (age 29 years), who said, “Food stamps are sometimes very good, but when they got cut off it is a very difficult situation for us. I would have to go to the grocery store and buy food with US money and bring the food home, but the food doesn’t last very long. Because the kids eat a lot now, and the foods I buy finish very quickly.”

Limited Culturally Appropriate Food and Land Access

Participants often spoke of limited access to culturally appropriate foods and land to grow desired crops as a major barrier to food security. Many discussed traveling far distances and crossing state lines to purchase culturally familiar foods in the US and their desire to have more of these foods closer to their current residence. For example, a Burundian refugee (age 64 years) said, “when we want to get African food, we have to travel to Georgia. So now it is so far away…We want African food nearer to us.” Similarly, another Burundian (age 37 years) stated, “once a month or every three months, I will make the trip to Georgia for African food.” Additionally, many of the women expressed the desire to farm their own foods but reported a lack of land access in their new homes as a barrier. A Burundian refugee (age 37 years) said, “I like to plant seeds, vegetables, fresh corn. In Africa I was a farmer, and I want to plant here. I request, if possible, a place to go to plant my seeds. I think the gardens are all full at this time; there is not enough places.”

Policy

Lastly at the outermost level of influence, policy, refugee perceptions of local, state and federal policies and laws affecting food security were explored.[33]

Miscomprehension of Program Policies

The refugee women reported miscomprehension of USDA nutrition assistance program policies as a major barrier to food security. When referring to signing up or renewing their nutrition assistance program accounts, participants reported miscomprehension of program policies regarding required paperwork, often leading to a loss of benefits. A Burundian refugee (age 34 years) recalled, “they [nutrition assistance program representative] sent me paperwork for reviewing, and I didn’t know what to do with this paperwork. After that I found no more money in the account.” Some participants indicated going months without benefits due to issues with paperwork; a Burundian refugee (age 55) reported, “sometimes I go three months without food stamps because I don’t know exactly after six months what I am supposed to report.”

Discussion

Conceptual frameworks, such as the SEM, are often used for formative research in the development of health promotion programs.[29] SEM frameworks explore relationships between various influences on health issues and help guide the selection of intervention strategies appropriate for priority populations.[29] The pattern of dietary acculturation barriers and facilitators to food security across the SEM emerged from the shared experiences of the sampled Burundian and Congolese refugee women. As a data driven framework, this finding confirms the complex, multifactorial nature of food security among refugees and warrants the use of socio-ecological approaches to inform future interventions among this population.

The majority of refugees in this study reported unemployment, less than a high school degree equivalent, and low socioeconomic status. These particular sociodemographics have been associated with low food security among the general US population[11] as well as various refugee groups.[3,6,8,9] The high rates of unemployment, low education, and low income among these Burundian and Congolese refugees may negatively impact their ability to achieve food security.

Similar to sociodemographics, certain acculturation indicators, such as limited English proficiency, have been repeatedly documented as a barrier to food security among refugees.[6,8,9] All the participants reported language as a barrier upon resettlement, and 13 of 18 reported current language struggles. English language proficiency appeared to compound other dietary acculturation barriers (negatively when limited) and facilitators (positively when proficient) to food security across all multilevels of the SEM framework. With a direct influence on other dietary acculturation factors, future interventions addressing food security in refugee populations should aim to also incorporate English language development.

Participants also reported unfamiliarity with US cooking methods and equipment as a major barrier to food security similar to other refugees.[3,6] The limited knowledge but desire to learn how to prepare American foods were similarly noted in this study.[3,6] To better empower refugees to overcome dietary acculturation barriers, future interventions addressing food security should include American cooking education.

Although various aspects of food shopping in the US, such as finding stores with desired foods, were previously noted as barriers to food security[3,6], this study highlighted difficulties using US currency, especially coinage, among the sampled population in this specific study. Relying solely on cashiers to return appropriate change may potentially threaten already limited economic resources. Food security interventions for this population should include components focused on US currency and basic arithmetic in context of food shopping.

Transportation was a major theme perceived as both a barrier and facilitator to food security across various levels of the SEM. Difficulties navigating public transportation are well established among recently arrived refugees.[15,16] As duration in the US increased, many of the participants reported improved access to food outlets with the addition of private transportation to their household. Although private transportation access may improve immediate food security, limited economic resources may not be sufficient enough to cover unforeseen car expenses. Training refugees to navigate the public transportation system to food outlets may have longer terms benefits to food security.

The impact of interpersonal level social network support on food security was a dominant theme among this Burundian and Congolese refugee community. Participants reported direct links between social network support and various dietary acculturation factors at other SEM levels. In some instances, social network support positively impacted food security by mitigating reported barriers with transportation, cooking methods/equipment, and locating culturally familiar foods. Food security interventions should aim to strength existing relationships within the community to prevent and/or overcome common dietary acculturation barriers among refugees.

Although orientation services were perceived as an important and major facilitator to food security, the dose of orientation services addressing dietary acculturation issues was a reported barrier. With the abundance of information given to refugees upon initial resettlement, follow-up orientations may be needed to truly facilitate food security. This finding may warrant additional funding to support the development and implementation of additional orientation services to improve overall food security of this vulnerable population.

The interviewed Burundian and Congolese refugees described a community norm to cross state lines for culturally appropriate foods. Although traveling long distances to larger cities for African foods was a unique practice among this group, other refugees have reported similar issues finding stores with desired foods in the US.[3,6] Moreover, their native farming and gardening practices have been lost due to lack of land access. Providing refugees with community gardening spaces and programs in their new homes can promote food security and provide community and social connectedness.[34]

Reports of reliance on nutrition assistance programs were a perceived facilitator to food security by the Burundian and Congolese refugee women. Although these safety net programs play an important role in food security, the overreliance of supplemental nutrition programs as the main food purchasing resource may lead to devastating impacts on food security if federal funding is cut and/or access is lost. Education on the role of nutrition assistance programs as a supplemental rather than the sole food resource is warranted. To complement this, referrals to other community food resources

(food pantries, soup kitchens, food banks, and other local food distribution programs) are necessary to fill household food resource gaps. Additionally, food budget management and low cost, healthy recipe education can help refugees establish coping mechanisms to deal with potential loss of benefits. Food security interventions with training on nutrition assistance program purposes, policies, procedures and required paperwork are warranted to address this common issue among the Burundian and Congolese refugees.

Although the SEM provided a clear framework to investigate dietary acculturation barriers and facilitators to food security at multiple levels, classifying these factors into designated levels may limit the interpretation of the results. It is important to note the reciprocal relationships and interactions between the factors and across the levels. Although some direct connections between factors at different levels were noted, some interactions may have been undetected.

Due to the nature of qualitative research and the small sample size, the findings cannot be generalized to all Sub-Saharan refugees resettled in the US.[22] Results indicated some similarities in dietary acculturation barriers and facilitators to food security among the Burundian and Congolese refugee women and other various refugee groups; however, it is important to recognize that refugees are not a homogenous population. In reality, resettled refugees arrive from diverse countries and live in diverse circumstances in the US. Future food security interventions should be tailored to the unique dietary acculturation experiences of specific refugee communities of interest.

Conclusion

This study provided exploration of the unique dietary acculturation experiences of Burundian and Congolese refugees living near a mid-sized city in the Southeastern region of the US. Many of the identified dietary acculturation barriers and facilitators to food security were consistent with previous research. The complex and dynamic

relationship between factors at various SEM levels demonstrates the need for a multi-level intervention to improve food security among refugees.

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Conflict of Interest

The authors declare no conflict of interest.

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CHAPTER III: Cultural Adaptation of a Cooking Curriculum for Burundian and Congolese Refugee Families

This chapter is a manuscript currently under review by the journal *Health Promotion Practice* by Marissa McElrone, Sarah Colby, Lisa Franzen-Castle, Melissa D. Olfert, Kendra K. Kattelmann, Hillary N. Fouts, Marsha Spence, Katie Kavanagh, and Adrienne A. White.

McElrone contributed to the conception and design of study, acquisition of data, analysis and interpretation of data, drafting the manuscript, revising the manuscript critically for important intellectual content, and approving the version of the manuscript to be published. Colby, Franzen-Castle, Olfert, Kattelmann, Fouts, Spence, Kavanagh and White contributed to the conception and design of study, revising the manuscript critically for important intellectual content, and approving the version of the manuscript to be published. All co-authors read and approved the final manuscript.

Abstract

Background: Sub-Saharan African refugees in the United States have reported low food security related to dietary acculturation issues. However, there is no existing evidence-based or culturally tailored cooking programs to address the unique barriers to food security for this population.

Objective: Culturally adapt a cooking curriculum for Burundian and Congolese refugees living in the Southeastern region of the US to address their unique dietary acculturation barriers to food security.

Methods: A four-phase curriculum adaptation process (information gathering [literature review, researcher informed, and formative research interviews (n=18)], preliminary adaptation design [data incorporation and steering committee (n=5)], pilot testing [n=10 youth/adult dyads], and refinement) was applied to the existing evidence-based iCook 4-H curriculum using a five strategy (peripheral, evidential, linguistic, constituent-involving and sociocultural) cultural adaptation framework. A multi-phase, two-cycle coding analytic process was completed within NVivo 12. First cycle attribute and

descriptive coding then second cycle pattern coding were applied to transcripts. Codes were organized into hierarchical maps and coding matrices for direct content analysis. **Results:** Seventeen adaptations were made to the iCook curriculum, derived from varying combinations of four data sources (literature review, researcher informed, priority population and steering committee), applying all five cultural adaptation strategies. A majority of the curriculum adaptations were derived from two or more data sources (71%) and were categorized within multiple adaptation strategies (88%). **Conclusion:** This study provided a community-based cultural adaptation process that could be used with various populations to address unique barriers and facilitators to food security. Future studies are needed to test the new culturally adapted curriculum, to evaluate the impact on the effectiveness to improve food security status among refugees.

Introduction

Increasing numbers of people are fleeing their homes to escape persecution, oppression, war or violence all over the globe.[1] When these refugees cannot safely return to their home countries they resettle in other countries, including the United States (US).[2] Although the US is typically considered as a nation with plentiful food resources, refugees have consistently low food security rates when compared to national averages of non-refugee populations.[3-11] This means they do not have stable access to nutritious, safe foods to support a healthful life.

According to the United States Department of Agriculture (USDA), 11.8% (15 million) of households in the US reported low food security.[11] However, nearly 25% of refugee households[3-10] and up to 85% of Sub-Saharan African refugee households have reported this condition.[3-7,9] Based on these rates, Sub-Saharan African refugees appear more at risk for low food security compared to other refugee groups and the general US population.[3-11]

Based on qualitative studies, dietary acculturation issues are barriers to

achieving food security among refugee populations resettled in the US.[3,4,6,12,13] Dietary acculturation is the process in which refugees adopt food choices and preparation habits, and consumption patterns reflecting their new residence.[14] Refugees from diverse parts of the world have reported dietary acculturation barriers to include cooking (limited American food knowledge)[3,6,8,15,16], shopping (unfamiliar foods and English barriers)[3,6,16], accessing (difficulties with transportation)[15-17] and affording (inadequate economic resources).[3,6,8,9,15,16,18,19] Moreover, Burundian and Congolese [20] refugees have reported additional dietary acculturation barriers to food security to include difficulty using US currency, insufficient dose of orientation services, limited culturally appropriate food and land access, and overreliance and miscomprehension of USDA nutrition assistance programs and policies.[16]

Refugee-specific nutrition curricula addressing dietary acculturation barriers to food security are limited.[21] The *Healthy Eating Flip Chart* was developed by the US Committee for Refugees and Immigrants (USCRI) to address refugee nutrition, healthy eating patterns and physical activity, but it is often offered without accompanying programming, greatly limiting access for low-literacy refugee populations.[21] Additionally, while this printed resource is available in multiple languages and intended for a broad refugee audience, few culturally reflective images of African refugees are used and it is not tailored for Sub-Saharan African refugees. Moreover, although similarities in dietary acculturation barriers to food security have been noted among Burundian and Congolese refugees and other refugee groups, some findings varied, reflecting the need for targeted curricula and interventions to adequately address the unique needs of the refugee community of interest.[16]

To help fill the gap, this study was designed to adapt an existing, evidence-based cooking curriculum and address food security and the unique dietary acculturation of Burundian and Congolese refugee families living near a mid-sized city in the Southeastern region of the US. This multiphase curriculum adaptation process was informed by previous research with the priority population[16] as part of a larger community-based research study.[22]

Methods

Evidence-Based Curriculum

The existing cooking curriculum, iCook 4-H, was an eight session, evidence-based, family intervention promoting cooking, eating and playing together, in which youth and adults were involved in the educational process.[23] The curriculum provided an appropriate foundation to address refugee dietary acculturation barriers to food security such as shopping, cooking, accessing and acquiring healthful foods in the US. The curriculum was developed for low socioeconomic status families and included low cost ingredients and recipes suitable for low income refugee families. Additionally, the iCook 4-H curriculum was grounded in the Social Cognitive Theory (SCT)[24] which has been successfully used in previous refugee health interventions.[25,26] The SCT components such as behavioral capability, self-efficacy and observational learning were used in the curriculum to dynamically share and gain knowledge and skills in a reciprocal manner between facilitators, adults and youth.[24,27] Moreover, as a potential avenue for effective refugee nutrition programming,[15] the iCook 4-H model involved youth-adult dyads and served as a vehicle to reach the primary target of the intervention, Sub-Saharan African refugee families, through the incorporation of youth. This dyad model promoted the communal transfer of traditional and post-resettlement shopping and cooking knowledge and skills between youth and adults.[15] Additionally, the iCook 4-H curriculum was designed for a group setting. This group setting was used to strengthen existing and build new social network support, a facilitator to food security,[16] among local refugee families. As an evidence-based, theory driven curriculum, iCook 4-H provided a foundation to target dietary acculturation barriers and facilitators to food security within an appropriate sociocultural context for the Sub-Saharan African refugee families in the study.

Cultural Adaptation Framework

The cultural adaptation framework was based on the common strategies for enhancing cultural appropriateness in health promotion programs identified by Kreuter and colleagues.[28] These five strategies, defined in **Table 3.1**, including peripheral, evidential, linguistic, constituent-involving and sociocultural adaptations,[28] were used to address dietary acculturation barriers and facilitators to food security through a targeted program for Burundian and Congolese refugee families. The five strategies were applied throughout all four phases of the curriculum adaptation process.

Data Collection

A four-phase curriculum adaptation process, adapted from the Barrera and Castro heuristic model,[29] was applied to the existing iCook 4-H curriculum. The four phases included: (1) information gathering from multiple data sources, (2) preliminary adaptation design based on the identified dietary acculturation barriers and facilitators to food security, (3) preliminary adaptation pilot testing, and (4) adaptation refinement. An overview of the curriculum adaptation process, including the phases and associated components, is depicted in **Figure 3.1**.

Phase I: Information Gathering

Literature Review

In the first phase of the curriculum adaptation, the research team conducted a database literature search and review to identify dietary acculturation barriers and facilitators to food security among refugees resettled in the US. The following databases were searched for relevant refereed research articles: Anthropology Plus, CINAHL, ERIC, Google Scholar, PubMed, Scopus, and Web of Science. Keywords included: “refugee”, Sub-Saharan African/Sub-Saharan Africa, Burundian/Burundi, Congolese/Congo, dietary acculturation, acculturation, food security, food insecurity, cultural adaptation, nutrition/dietary/physical activity/health/cooking intervention. First, the research team completed a review of abstracts to identify relevant articles. Then, full text articles were examined and those fitting the aims of the literature review were

Table 3.1 Definitions of cultural adaptation strategies

Strategy	Definition
Peripheral	Culturally appropriate program materials that reflect images and experiences of the priority population
Evidential	Enhance perceptions of the health issue relevance in the target group through related data
Linguistics	Materials accessible in both dominant language and emic terminology
Constituent-involving	Involve the priority population in all aspects of the program from assessment to evaluation
Sociocultural	Promotes discussions of the health issue in the appropriate context of broader social values and characteristics

Source: Kreuter MW, Lukwago SN, Bucholtz DC, Clark EM, Sanders-Thompson V. Achieving cultural appropriateness in health promotion programs: Targeted and tailored approaches. Health Educ Behav. 2003;30:133-146.

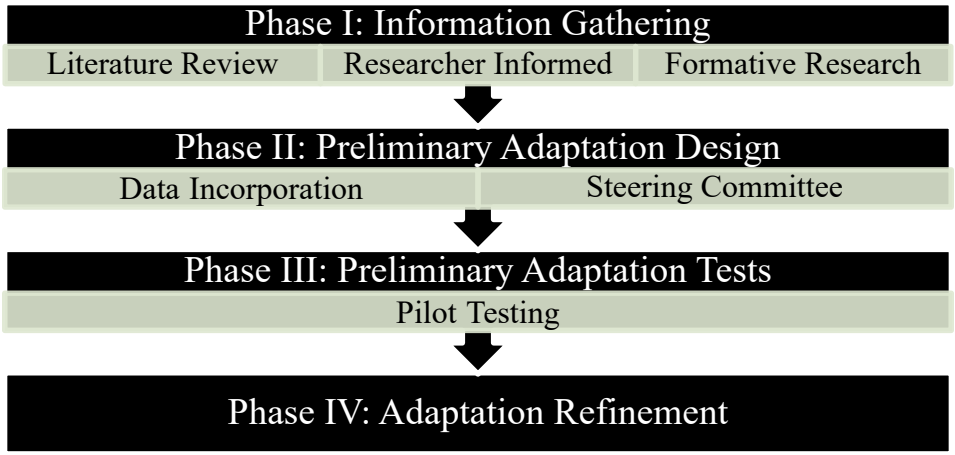

Figure 3.1 Overview of the curriculum adaptation process

Source: Barrera M, Castro FG. A heuristic framework for the cultural adaptation of interventions. Clin Psychol-Sci Pr. 2006;13:311–316.

retained and relevant data were extracted. The existing literature informed adaptations such as content additions, program planning, implementation and evaluation.

Researcher Informed

Additionally, researcher-informed knowledge of cultural practices and language skills (Swahili), gained from over two years of residence in a rural, Sub-Saharan African village in East Africa, provided foundational information to improve engagement and communication with the priority population.[30] To build rapport with the local Burundian and Congolese refugee community, the lead researcher taught English as a Second Language classes for 20 months at a local refugee program prior to and throughout the research study.[31] This prolonged engagement led to relationship building and identification of key stakeholders, community leaders and local refugee families that participated in various phases of the larger community-based research study as paid translators/interpreters, steering committee members, or research participants.[31]

Formative Research

Next, formative research was conducted through semi-structured interviews (n=18) with Burundian and Congolese refugee women to identify their unique dietary acculturation barriers and facilitators to food security.[16] The detailed methods and findings from this study are reported elsewhere.[16]

Phase II: Preliminary Adaptation Design

Data Incorporation

In the second phase, the data gathered in phase I were incorporated into the existing iCook 4-H curriculum. This was aided by a multilingual member of the priority population.[30]

Steering Committee

Next, a criterion-specific sample (n=5) was recruited by email, phone calls, and word-of-mouth through local refugee programs using network then snowball sampling methods.[3-5,30,32] Participants meeting the following inclusion criteria were invited to participate: 18 years of age or older, and a member for one of the following categories: academic researcher, Extension agent/specialist, 4-H professional, priority population

representative, and/or key community stakeholders, living near the city of interest. The recruited steering committee members were all fluent in English and consisted of an academic researcher, Extension agent, key community stakeholders, and a representative from the priority population. All participants gave written informed consent and were given $20 gift card incentives for their feedback on each session.

Over 8 consecutive weeks, the steering committee members provided feedback on the curriculum, focusing on one session per week. Based on availability, committee members provided weekly feedback either at face-to-face meetings or through email. The 8, one hour long face-to-face meetings were scheduled and held at the convenience and preferred location of the majority of the steering committee members (often after existing refugee programing), and were documented through extensive fieldnotes.[30-34] Committee members were asked to review the curriculum using a provided evaluation tool developed for use in this study based on the Kreuter and colleagues five strategies for enhancing cultural appropriateness in health programs.[28] The evaluation tool included a series of open-ended questions, listed below, to explore the relevance of the peripheral, evidential, linguistic, constituent, and sociocultural adaptations.[28] Members were asked to provide feedback and recommendations on each topic and activity in the session to improve cultural appropriateness of the curriculum for the targeted Burundian and Congolese refugee families.[28] The question included in the curriculum adaptation evaluation tool were:

- What should this activity/topic be named to be more relevant to priority population?
- What images should be included to reflect the priority population?
- What program materials should be included/changed to be more relevant to the priority population?
- What other relevant topics should be included in this activity/topic area?
- What types of foods/recipes should be added/changed?
- What else needs to be considered to make this session more culturally and linguistically relevant to the priority population?

Phases III & IV: Preliminary Adaptation Tests & Adaptation Refinement

Pilot Implementation

After completion of phases I and II, the adapted curriculum was pilot tested in the priority population (n=10 dyads). Participant feedback was collected through process evaluations during every session and was iteratively incorporated into subsequent sessions as part of the adaptation refinement. Lastly, participant feedback was collected at the end of intervention eliciting the feasibility and acceptability of the adapted curriculum. Detailed pilot implementation methods, evaluation, and results are reported elsewhere.[35]

Data Analysis

Researchers used a multi-phase analysis process to identify and organize the major curriculum adaptations, their data sources, and cultural adaptation strategies applied throughout the curriculum adaptation process.[36-38] In the first phase, data were transcribed and uploaded to NVivo (Version 12; QSR International Pty Ltd., 2018) for storage and organization. Next, the research team developed a priori codes (data sources and cultural adaptation strategies) and data-driven codes (curriculum adaptations) and a codebook, which was iteratively revised as needed.[36,37] This codebook was used to guide coding, document code definitions, and systematically organize codes into major categories.[37,38]

In the second phase of analysis, first cycle attribute coding was manually applied to transcripts by a single coder to log the data source (literature, researcher informed, priority population, or steering committee).[36] Next, first cycle descriptive coding was applied to provide an inventory of the curriculum adaptations.[36] In the third phase of analysis, the same coder completed second cycle pattern coding to the same transcripts to identify the appropriate cultural adaptation strategy (peripheral, evidential, linguistic, constituent, or sociocultural).[36] Codes were organized, categorized, and assembled into hierarchical maps and matrices for direct content analysis.[38] In cases of discrepancy between data sources (differing curriculum adaptation recommendations), member checking with the targeted community was used to limit analysis bias.[36,37]

Results

Seventeen major categories of curriculum adaptations resulted from the cultural adaptation process as described in **Table 3.2**. The curriculum adaptations were derived from four data sources (literature review, researcher informed, the priority population, and steering committee), in varying combinations and from different adaptation phases, as depicted on the far left, **Table 3.2**. As shown on the far right, all five cultural adaptation strategies were applied in the various curriculum adaptations. A majority of the curriculum adaptations were derived from two or more data sources (71%) and were categorized within multiple adaptation strategies (88%). The specific curriculum adaptation descriptions are detailed in **Table 3.2**.

The original iCook 4-H curriculum included many topics and activities identified as barriers to food security among the priority population related to shopping and cooking healthful foods in the US.[16] Topics/activities (see *New Activities* in **Table 3.2**) were added to address additional barriers to food security among the priority population not already addressed in the existing curriculum. Moreover, parts of both the existing and adapted curriculum provided follow-up to many topics initially presented in orientation services such as proper use of stoves/ovens (low dose of orientation services was a noted barrier to food security).[16]

Discussion

Conducting a cultural adaptation of the iCook 4-H curriculum, *Pika Pamoja* was created and tailored for Burundian and Congolese refugee families, using the theory-driven,[24] evidence-based design of the original curriculum.[23] Existing iCook 4-H components (group setting and dyad model) reflected relevant sociocultural values[16] and promoted the transfer of knowledge and skills between youth and adults to foster food security.[15] Additionally, since the original iCook 4-H curriculum included some dietary acculturation barriers and facilitators to food security, it was easy to incorporate

Table 3.2 Phase, data source, curriculum adaptation, descriptions of change and adaptation strategies applied in the cultural adaptation process

Phase	Data Source	Curriculum Adaptation	Description of Change	Adaptation Strategy				
				P	E	L	C	S
II-III	▲ ◆	Title: *Pika Pamoja*	The original title *iCook* was perceived to exemplify the American value of individualism. The title was changed to *Pika Pamoja (Cook Together* in Swahili) to emphasize the cultural value of collectivism and community.	✓				✓
I-IV	● ■ ▲ ◆	Multilingual research staff	A multilingual member of the priority population was hired for translation and interpretation services throughout curriculum adaptation phases I-IV. Additionally, the lead researcher had advanced level Swahili language proficiency in reading, writing and speech.			✓	✓	
I-II	● ◆	Culturally relevant images/activities	Program materials with images representative of the priority population were used, including culturally relevant activities and discussion examples.	✓				
I-II	● ■ ◆	Linguistically appropriate program/materials	Programming and program materials were provided in both English and Swahili.			✓	✓	
I-IV	● ■ ▲ ◆	Appropriate literacy level	All materials were adapted to include pictures and reduce word count for low-literacy individuals. Picture step instructions were added to all recipe handouts, including pictures of final recipe items.			✓	✓	
I-III	● ▲	English language development components	Materials/handouts and programming were provided in both English and Swahili to build English language knowledge and skills (identified barrier to food security[16]) and to encourage transfer of English language knowledge and skills between youth and adult participants.[15]		✓		✓	
I	● ▲	*New Activity:* Kitchen BINGO	This activity was added as an interactive review of the newly introduced cooking utensils/equipment to address barriers of unfamiliarity of nontraditional foods, cooking methods and equipment in the US.[3,6,8,15,16]		✓		✓	

Table 3.2 Continued

Phase	Data Source	Curriculum Adaptation	Description of Change	Adaptation Strategy				
				P	E	L	C	S
I	● ▲	*New Activity:* How Do We Get There?	This activity addressed the barrier of difficulties with public transportation to food outlets[15-17] through identifying bus routes to/from their homes and preferred food outlets on paper and electronic local bus route maps, discussing reduced fare programs, and common bus etiquette and practices in the US.		✓		✓	
I-II	● ▲ ◆	*New Activity:* Let's Shop	This activity addressed multiple barriers of food security among the priority population including: limited economic resources[3,6,8,9,15,16,18,19], overreliance and miscomprehension of USDA nutrition assistance programs and policies, and difficulty with US currency.[16] It included topics, activities, and role-plays focused on food budgeting, bargain shopping (coupons, generic brands, bulk), low cost recipes, and using US currency and basic arithmetic in context of food shopping. Additionally, it included topics/discussions regarding USDA nutrition assistance program applications, paperwork, common procedures and the utilization in food outlets.		✓		✓	
II	◆	*New Activity:* Fun Food Fix	This activity added additional emphasis on safe food storage identified as an issue among the priority population by the steering committee.		✓			
I-III	▲ ◆	*New Activity:* Let's Talk Food	The activity provided opportunity for dialogue about related cultural practices pre and post resettlement. It emphasized that old and new food related cultural practices were neither good nor bad, just different. This activity was placed in session 1 to promote continued discussions about the dietary acculturation process throughout the entire program.				✓	✓

Table 3.2 Continued

Phase	Data Source	Curriculum Adaptation	Description of Change	Adaptation Strategy				
				P	E	L	C	S
I & III	▲	Community resource referrals	Addressing barriers of limited cultural relevant food and land access, the program provided referrals to community gardens and discussed the local food outlets with culturally relevant food availability.[16] Referrals to food banks/pantries and USDA nutrition assistance programs were also provided to address limited income, a noted barrier to food security.[16]		✓		✓	
III-IV	▲	Incorporation of religion	Incorporated time for prayer before each meal at every session.				✓	✓
II-IV	▲ ◆	Incorporation of meat	Provided additional meat recipes for participants to try at home.				✓	✓
III-IV	▲	Program completion certificates	Provided program completion certificates, identified as a common cultural practice by the priority population, to all who completed the program.				✓	✓
III-IV	▲	Open family sessions	For families with more than one youth between the ages 8-12, allowed additional youth to participate in the sessions without assessments to recognize the cultural value of family.				✓	✓
II-III	▲ ◆	Location and time	Used facility/resources of an existing refugee program to address the following priority population needs: transportation, childcare, schedules (time slot already on family schedules making it easier for parents working split shifts), and season (summer when youth were out of school).				✓	✓

Curriculum Adaptation Process Phase
I – Phase I: Information Gathering
II – Phase II: Preliminary Adaptation Design
III – Phase III: Preliminary Adaptation Tests
IV – Phase IV: Adaptation Refinement

Data Source
● Literature review
■ Researcher-informed
▲ Priority population
◆ Steering committee

Adaptation Strategy
P – Peripheral
E – Evidential
L – Linguistic
C – Constituent-Involving
S – Sociocultural

supplemental activities to target the unique needs of the Burundian and Congolese refugee families.

A majority of the curriculum adaptations were derived from agreement in the four sources of data; however, there was one notable disagreement during the cultural adaptation process. The steering committee felt the recipes should be altered to include more culturally relevant ingredients; however, data from the literature review and formative research indicated a need and desire to address unfamiliarity of nontraditional foods, cooking methods and equipment in the US through the use of American recipes.[3,6,16] When the priority population was consulted on the discrepancy, they echoed the formative research findings resulting in the retention of the original American recipes. Not only does this discrepancy support the need for multiple data sources and data collection methods in curriculum adaptation processes, but it also speaks to the need to assess each specific population for their preferred curriculum content throughout the cultural adaptation process. The importance of consulting with the priority population is evident. In the future, the desires of the priority population must be addressed when considering adaptations of recipes with culturally relevant foods.

Acculturation, dietary and otherwise, is a complex and dynamic process with various negative health impacts associated with the opposing spectrum sides among refugees. Researchers have shown refugees reporting low acculturation, often closer to resettlement, have lower rates of food security;[4] however, refugees reporting high acculturation, often associated with increased time in the US, have higher risk of diet-related diseases[18,39,40] than their respective counterparts. This juxtaposition provides a unique opportunity to culturally adapt curriculum for refugees to address dietary acculturation barriers and facilitators to improve food security while simultaneously providing nutrition education to mitigate diet-related diseases in the future. The adapted program included supplemental activities to address the unique experiences of the priority population to promote food security, while the original iCook 4-H curriculum provided family nutrition education to promote healthy, long term diet and physical activity behaviors.[22,23]

Although the cultural adaptation process and resulting curriculum adaptations were targeted for Burundian and Congolese refugee families, the procedures detailed

here can be adopted with other refugee or hard-to-reach populations. This community-based cultural adaptation process goes beyond surface structure adaptations (visual and auditory elements) and leads to more comprehensive and deep structural adaptations (core cultural values, norms and stressors) to improve intervention acceptability.[41] Culturally adapted curriculum can be used to better address the needs of targeted populations, but the process must be carried out in a methodical way to retain theory-driven models and use multiple data sources to achieve the most appropriate and effective programming. To appropriately address food security among refugees, future interventions should be targeted uniquely to the dietary acculturation experiences of specific refugee communities of interest.

Various methods were used to mitigate and decrease analysis biases. Triangulation of curriculum adaptations through various data collection methods and multiple data sources improved the accuracy of findings.[33] Additionally, member checking with the priority population was used in cases of discrepancy between data sources.[36,37] Although prolonged engagement is often time intensive, persistent observation and contact with the priority population before, during and after the study increased credibility.[31] Lastly, the cultural adaptation described here was highly tailored to Burundian and Congolese refugee families. As will all tailoring approaches, to meet the needs of other refugee groups, individual tailoring of iCook 4-H is necessary.

Conclusion

Based on consistent reports of low food security among various refugee populations,[3-10] culturally and linguistically appropriate interventions are needed to address unique dietary acculturation and food security experiences. This study provided a community-based cultural adaptation process that could be adopted with various refugee populations to address dietary acculturation barriers and facilitators to food security. Future studies are needed to test *Pika Pamoja,* the new culturally adapted

curriculum, to evaluate the impact on the effectiveness to improve food security status among refugees.

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Conflict of Interest

The authors declare no conflict of interest.

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CHAPTER IV: Feasibility and Acceptability of Implementing a Culturally Adapted Cooking Curriculum for Burundian and Congolese Refugee Families

This chapter is a manuscript currently under review by the journal *Ecology of Food and Nutrition* by Marissa McElrone, Sarah Colby, Hillary N. Fouts, Marsha Spence, Katie Kavanagh, Lisa Franzen-Castle, Melissa D. Olfert, Kendra K. Kattelmann, and Adrienne A. White.

McElrone contributed to the conception and design of study, acquisition of data, analysis and interpretation of data, drafting the manuscript, revising the manuscript critically for important intellectual content, and approving the version of the manuscript to be published. Colby, Fouts, Spence, Kavanagh, Franzen-Castle, Olfert, Kattelmann, and White contributed to the conception and design of study, revising the manuscript critically for important intellectual content, and approving the version of the manuscript to be published. All co-authors read and approved the final manuscript.

Abstract

Background: *Pika Pamoja* (*Cook Together* in Swahili) is an eight-session cooking curriculum for Burundian and Congolese refugee families, culturally adapted from the evidence-based iCook 4-H curriculum. In addition to the cooking, healthful eating, family physical activity, and mealtime constructs from iCook 4-H, the program was adapted to address dietary acculturation barriers to and facilitators of food security.
Objective: The goal of this study was to determine the feasibility and acceptability of implementing *Pika Pamoja*.
Methods: Researchers and a multilingual community aid implemented *Pika Pamoja* in a pre-post pilot intervention with randomized control (n=5)/treatment (n=5) dyads (youth/mother) over eight consecutive weeks. Assessment tools developed for the iCook program were adapted for use in *Pika Pamoja*. Feasibility (recruitment/retention, implementation, fidelity testing, and dyad assessment procedures) and acceptability (process and program evaluations) measures were collected. Fidelity measures, including meeting session objectives, leader effectiveness and participant engagement, were collected for all sessions by a trained evaluator.

Results: All 10 dyads (control and treatment) were retained throughout the study. Across sessions, the fidelity evaluator rated 96% of session objectives met, leaders 94% effective, and youth and adults engaged 91% and 96% of the time, respectively. The final youth assessment instrument was 25 items, including scales for cooking skills (α=0.93), cooking self-efficacy (α=0.90), openness to new foods (α=0.81), and eating (α=0.68), playing (α=0.90) and setting healthful goals (α=0.88) together as a family. The adult instrument was 26 items, including scales for cooking, eating, and playing together (α=0.68), kitchen proficiency (α=0.89), and food security (α=0.79). Participant feedback was uniformly positive.

Conclusion: Based on these results, *Pika Pamoja* was feasible to implement and was accepted by the priority population. Larger scale studies to measure the effectiveness of *Pika Pamoja* to increase food security among refugee families are needed.

Introduction

iCook 4-H, an out-of-school childhood obesity prevention program for youth (9-10 years old) and their primary meal preparer, aims to increase healthful cooking, eating, and playing together as a family.[1] The curriculum was designed and tested for dissemination using a community based-participatory research approach through the United States (US) Extension based youth development organization, 4-H.[1,2] Consistent with the 4-H learn-by-doing approach, iCook 4-H promotes youth engagement with adult role models and experiential learning opportunities.[3] Additionally, iCook 4-H uses a Social Cognitive Theory (SCT) framework to promote healthful cooking skill development, enhanced family mealtime experiences, and increased physical activity through reciprocal role and behavioral modeling.[4]

iCook 4-H has been tested in both a randomized control trial intervention study, and then in a nonrandomized dissemination study in a practice setting.[1] Sample populations in both studies were predominately US born, non-Hispanic White populations.[1] However, the cooking, healthful eating, family physical activity, and mealtime constructs

from iCook 4-H could also be beneficial to diverse, underserved populations that were underrepresented in these studies.

Key iCook 4-H curriculum design elements including the SCT framework,[5,6] youth/adult dyad model,[7] and group setting[8] have been shown as successful and/or suggested avenues to deliver health interventions to resettled refugee populations living in the US. Specifically, the use of these intervention components has been suggested to address low food security rates reported among refugee populations.[8] Compared to the national average (12%),[9] refugee households disproportionately experience low food security (nearly 25%), with the highest rates reported by those from Sub-Saharan Africa (up to 85%).[10-17] Based on refugee-focused research, barriers to food security include issues with dietary acculturation. The dietary acculturation process in which refugees adopt foods, preparation practices and dietary patterns of their new home[18] leads to difficulties with cooking, shopping, accessing, and affording healthful foods in the US.[7,8,10,13,15,16,19-21] Although researchers have reported these barriers, refugee-specific curricula addressing dietary acculturation and food security experiences are limited.[22] The iCook 4-H curriculum provided appropriate sociocultural design elements suggested for refugee food security interventions, while its focus on healthful cooking, eating and playing together as a family allowed easy integration of supplemental activities to address the unique dietary acculturation experiences of targeted refugee communities.

The evidence-based, theory driven iCook 4-H curriculum was culturally adapted to address food security and the unique dietary acculturation experiences of the dominant refugee population living near a mid-sized city in the Southeastern region of the US.[23] The result of this community-based cultural adaptation was *Pika Pamoja* (*Cook Together* in Swahili), an eight-session cooking curriculum for Burundian and Congolese refugee families.[23] While the original curriculum title was perceived to exemplify the American value of individualism, this new title aimed to emphasize the priority population's cultural value of collectivism and community.[23] This study was designed to test the feasibly and acceptability of implementing and evaluating *Pika Pamoja* for

Burundian and Congolese refugee families. This pilot testing, part of a larger community-based research study,[1] will be used to inform future, larger scale studies.

Methods

Data Collection

Participants

A criterion-specific sample (n=10 youth/mother dyads) was primarily recruited by word-of-mouth through existing local refugee programs using network and then snowball sampling methods.[10,13,16,24,25] Dyads meeting the following inclusion criteria were invited to participate: youth—8-12 years of age and free of dietary restrictions; adult—18 years of age or older, self-reported refugee status, native of Sub-Saharan African country, self-reported primary meal preparer in their family, and free of dietary restrictions. The youth age range of the original iCook 4-H curriculum was 9-10 years;[2] however, the inclusion criteria was expanded to ease recruitment. Because primary meal preparers in the priority population are typically female, the study included only females as the adult dyad member.[14] All adult female participants self-reported as biological mothers of their respective youth. Dyads were excluded from the study if the adult member was born in the US.

Procedures and Measures

All adult participants gave written informed consent and all youth gave written and verbal assent. Youth and adult participants were assessed by trained research staff at baseline and within one month following the intervention for all program evaluation measures, except demographics (baseline only). Each participant was given a $10 gift card at the completion of each assessment. Assessments were conducted privately at each participant's convenience and preferred location, often the participant's home, with the aid of a culturally and linguistically appropriate interpreter who translated from English to the participant's preferential language, Swahili or Kirundi, and vice versa.

Additionally, the researcher conducting assessments had advanced level Swahili language skills. Assessments were documented through audio-recording and extensive note-taking.[24,25] After baseline assessments were completed, the dyads were randomly assigned to either the control or treatment group. The treatment group completed the pilot program intervention over two months while the control received no intervention.

The primary outcome measures, *feasibility* and *acceptability* of implementation and evaluation, were evaluated in several ways with assessments completed by the researchers, the facilitators, and the participants. Details regarding the specific assessment instruments, their associated descriptions, collection time points, data collectors, and the objectives measured with each instrument are described in **Table 4.1**. The fidelity instruments and program evaluation tools, pre/post surveys and Ripple effect mapping [REM][26], were adapted from original iCook 4-H instruments.[27,28] REM is a qualitative program evaluation tool that explores participant perceptions of the program's impact on individuals, families, and communities.[29] Following practices outlined by Bernard (2011), all participant-focused instruments were tested with three members of the priority population, who were not study participants, for wording, content and cultural relevance.[25] Suggested revisions such as to reduce word count and clarify words, like "thaw" to "unfreeze" were incorporated into the final survey instruments. Additionally, based on their feedback, the community capitals framework was removed from the REM session[26] to provide a simpler program evaluation process.

Program Implementation

Over eight consecutive weeks from June to August 2018, a researcher and a multilingual community aid implemented *Pika Pamoja* at a local refugee programming site. Treatment dyads were encouraged to cook, eat, and play together at home between sessions. The lead researcher/facilitator was fluent in English with advanced level proficiency in Swahili and the community aid was multilingual in English, Swahili and Kirundi. Based on priority population and community stakeholder input,[23] the two-hour sessions were scheduled for Monday mornings at the same time as an existing English as a Second Language (ESL) class. Free, onsite childcare for younger children and transportation to and from the site were provided to participating families at every

Table 4.1 Instruments and their descriptions, data collection time points, data collectors, and objectives measured to evaluate feasibility and acceptability of Pika Pamoja

Outcome Measure	Instrument	Instrument Description	Data Collection Time Point	Data Collector	Objective(s) Measured
Feasibility	Recruitment and retention records	Detailed recruitment, retention and session attendance records were kept from recruitment to post-assessment study phases.	Pre through post intervention	Researcher	1. Recruitment method success 2. Recruitment rate 3. Retention rate 4. Session attendance
	Facilitator debriefs	Verbal debrief sessions with facilitators (researcher and community aid) about what worked well/not well, allotted time, and level of comfort with session. Responses were documented through extensive note-taking. [24,25]	Immediately after every session	Researcher	1. Perceptions of session implementation feasibility 2. Opportunities for improvement
	Fidelity testing	The fidelity instrument was adapted from the original iCook 4-H curriculum.[27] The evaluator, present at all sessions, was trained by the lead researcher to observe and record fidelity data using the provided instrument.	During every session	Evaluator (community stakeholder)	1. Session objectives met 2. Leader effectiveness 3. Participant engagement

Table 4.1 Continued

Outcome Measure	Instrument	Instrument Description	Data Collection Time Point	Data Collector	Objective(s) Measured	
Acceptability	Process evaluation	Treatment participants were verbally asked in a group setting what they liked/did not like in the session. Responses were documented through extensive note-taking. [24,25]	At the end of every session	Researcher with multilingual community aid	1. Participant satisfaction 2. Areas for improvement	
	Program evaluations	1. Pre- and post-intervention survey—This pilot study served to develop the final survey instrument, and to test its acceptability among priority population.[28]	Within 30 days pre- and post-intervention	Researcher with multilingual community aid	**<u>Youth Survey</u>** **(26 items)** 1. Cooking skills (n=8) 2. Cooking self-efficacy (n=6) 3. Openness to new foods (n=3) 4. Family mealtime (n=4) 5. Family physical activity (n=3) 6. Healthful goal setting (n=2)	**<u>Adult Survey</u>** **(27 items)** 1. Cooking, eating and playing together as a family (n=15) 2. Physical Activity (n=1) 3. Kitchen proficiency (n=10) 4. Food security (n=6)
		2. Ripple effect mapping (REM) evaluation instrument[26]	Built into the last session	Researcher with multilingual community aid	Participant perceptions of the impact of the program on participants, families and the community	

session. Both youth and adult treatment participants received $10 gift cards for each session attended.

Data Analysis

Quantitative data were entered into Excel (Version 16.26; Microsoft, 2019) by a trained researcher and then imported into SPSS 24 for analysis (Version 24.0; IBM Corporation, 2016). Descriptive statistics were computed. Cronbach's alpha was calculated to determine the internal consistency of items from the survey instruments. Items reducing the reliability of the scale to less than 0.6 were removed from the instrument used in this study. Given the small sample sizes, descriptive analysis of pre-post changes in mean scores were calculated and Cohen's d effect sizes were presented to compare the control to the treatment group over time (negligible=0.2; medium=0.5; large=0.8). Confidence intervals around the pre-post mean differences within groups were calculated to explore the precision of the estimates.

Qualitative data were uploaded to NVivo (Version 12; QSR International Pty Ltd., 2018) for storage and organization, coding and then analysis to identify and organize the major evaluation feedback. First cycle attribute coding was manually applied to data by a single coder to log the evaluation instrument (facilitator debrief, process evaluation or REM).[30] Next, the same coder completed first cycle descriptive coding to provide an inventory of the evaluation feedback.[30] Codes were organized, categorized, and assembled into matrices for direct content analysis.[31]

Results

Descriptive Statistics

Sociodemographic data were collected at baseline between May and June 2018 in the homes of participants, extended family members and/or neighbors. Sample characteristics of the youth and adult dyads are summarized in **Table 4.2**. Although all participants were not originally resettled in the same US locations, all were residing near

Table 4.2 Sociodemographic characteristics and acculturation indicators of youth/adult dyads (n=10)

Characteristic	Categories	n (%)	Mean (± SD)	Range
Youth Participant				
Sex	Female	4 (40)	-	-
	Male	6 (60)	-	-
Age (years)		-	10 (± 2.0)	8-12
Adult Participant				
Sex	Female	10 (100)	-	-
Age (years)		-	38 (± 7.8)	29-56
Country of Origin				
	Burundi	7 (70)	-	-
	Democratic Republic of Congo	3 (30)	-	-
Adult Marital Status	Married	10 (100)	-	-
Education Level				
	< High School Degree	8 (80)	-	-
	≥ High School Degree	2 (20)	-	-
Employment				
	Employed	4 (40)	-	-
	Unemployed	6 (60)	-	-
Limited English Proficiency				
	Yes	8 (80)	-	-
	No	2 (20)	-	-
Length of time in US (months)		-	49 (± 33.4)	20-117
Household				
Participation in government assistance programs (income proxy)	Yes	10 (100)	-	-
Number of children in house		-	5 (± 1.5)	2-7
Number of adults in house		-	2 (± 0.9)	2-5
SD indicates standard deviation				

the mid-sized city in the Southeastern region of the US throughout the duration of the study.

Feasibility of Implementation & Evaluation

Recruitment and Retention

Network and snowball sampling recruitment methods were deemed appropriate and successful among the priority population.[24,25] Because of limited space at the intervention site, the maximum sample was set at ten dyads (5 control and 5 treatment). The first ten dyads reviewed for eligibility met the inclusion and exclusion criteria and were successfully recruited to participate in the study. The ten consenting dyads were randomly assigned to the control (n=5) or treatment (n=5). The retention rate of the ten dyads was 100% from baseline to post-assessments; however, treatment dyad session attendance fluctuated as shown in **Table 4.3**. Six of the eight intervention sessions were attended by all five treatment youth, while only two of the eight sessions were attended by all treatment adults. Youth participants noted their missed attendance was because of schedule conflict (e.g. summer camps), while adult participants noted changes in work schedule, various appointments, and oversleeping after night shift work as reasons for absences. Additionally, half of the sessions were attended by an additional 1-2 youth from the treatment families that were not officially part of the study.

Table 4.3 Session attendance of treatment youth/adult participants

Session	***Participants in attendance***		
	Treatment Youth	*Treatment Adult*	*Additional Youth (not part of the study)*
1	5	4	2
2	5	5	2
3	5	4	0
4	5	4	1
5	4	2	0
6	5	3	0
7	4	3	0
8	5	5	2

Facilitator Debriefs

Overall, debriefs indicated facilitators perceived that the program facilitation guides and materials were easy to use, and they were comfortable teaching the sessions. However, facilitators perceived most sessions as rushed and indicated a need for either longer sessions or a reduction in the number of activities in each session. Facilitators indicated that time allotted for language interpretation was limited. Additionally, facilitators reported the control dyads discussed specific intervention elements and activities with them during implementation indicating possible contamination.[32]

Fidelity Testing

On average, the fidelity evaluator rated 96% of session objectives met, leaders 94% effective, and youth and adults engaged 91% and 96% of the time, respectively. All eight sessions started a mean of 10 minutes late (± 0.5) and finished a mean of 3 minutes early (± 5.3). The fidelity evaluator noted late starts were due to late participant arrivals and early completions were due to transportation schedules.

Dyad Assessment Procedures

Regardless of English language proficiency, all adult participants preferred to complete pre- and post-assessments in their native language with the aid of the interpreter. Due to potential literacy barriers in the priority population, all adult responses were recorded by a trained researcher. All but two youth preferred to complete the pre- and post-assessments on their own, without an interpreter.

Acceptability of Implementation & Evaluation

Process Evaluations

Overall, process evaluations indicated uniformly positive participant feedback. Participants expressed interest in inviting others (friends and family) to the program and extending the program to 10-12 weeks. Additions/changes participants requested were to receive program completion certificates, to provide all the Swahili program materials in English to help with language development, and to include more recipes using meat. Similar to the results from the facilitator debriefs, participants perceived that many of the sessions had too many activities for the time allotted.

Program Evaluations

Pre- and post-intervention survey

Based on Cronbach's alpha (cut-off $\alpha<0.6$), one item was removed from both the youth and the adult survey instruments. The final youth assessment instrument included 25 items, including scales for cooking skills ($\alpha=0.93$), cooking self-efficacy ($\alpha=0.90$), openness to new foods ($\alpha=0.81$), and eating ($\alpha=0.68$), playing, ($\alpha=0.90$) and setting healthful goals ($\alpha=0.88$) together as a family. The adult instrument included 26 items, including scales for cooking, eating, and playing together ($\alpha=0.68$), kitchen proficiency ($\alpha=0.89$), and food security ($\alpha=0.79$). The pre- and post-intervention survey assessment process was accepted by the participants, including the control dyads who did not receive the intervention; however, all control dyads expressed interest in participating as a treatment dyad in future interventions.

Program outcome evaluation

The comparison of pre- and post-intervention outcomes in youth and adult control and treatment groups is shown in **Table 4.4**. The treatment youth appeared to have pre-post mean increases in cooking skills ($d=2.38$), cooking self-efficacy ($d=0.34$), eating ($d=0.69$) and setting healthful goals ($d=0.42$) together as a family, but a decrease in playing together ($d=-0.63$). However, the effect size for changes in openness to new foods was negligible ($d=-0.08$). The treatment adults appeared to have pre-post mean increases in cooking, eating, and playing together ($d=3.47$), and kitchen proficiency ($d=4.95$), and a decrease in food security scores ($d=-1.03$), indicating an improvement in food security status.

Ripple Effect Mapping

Results of the REM are depicted in the **Figure 4.1**. Following the REM guidelines, treatment participants were asked a series of questions and their responses were directly recorded on the map. First, participants were asked as a result of *Pika Pamoja*: 1.) what are people doing differently, 2.) who benefits and how, and 3.) what changed in the way community groups do things. Then, participants were asked, using group consensus, to identify the items on the map that they perceived to 1.) be the most important, 2.) promote the most bonding, and 3.) develop the most bridging with new

Table 4.4 Comparison of pre- and post-intervention survey outcomes in youth and adult treatment and control groups

Scale	Group	Pre Values Mean (± SD)	Post Values Mean (± SD)	Mean Difference (± SD) [95% CIs]	Cohen's d
Youth					
Cooking skills	Control	24.2 (± 7.76)	20.2 (± 5.89)	-4.0 (± 3.08) [-6.7 to -1.3]	2.38
	Treatment	27.8 (± 5.93)	32.8 (± 7.40)	5.0 (± 4.36) [1.2 to 8.8]	
Cooking self-efficacy	Control	20.4 (± 4.78)	21.0 (± 5.70)	0.6 (± 1.52) [-0.7 to 1.9]	0.34
	Treatment	22.0 (± 5.61)	23.4 (± 6.50)	1.4 (± 2.97) [-1.2 to 4.0]	
Openness to new foods	Control	7.4 (± 2.70)	8.6 (± 4.39)	1.2 (± 2.68) [-1.1 to 3.5]	-0.08
	Treatment	12.2 (± 1.79)	13.2 (± 1.64)	1.0 (± 2.55) [-1.2 to 3.2]	
Eating	Control	15.0 (± 2.83)	14.2 (± 2.05)	-0.8 (± 1.30) [-1.9 to 0.3]	0.69
	Treatment	15.6 (± 1.95)	16.0 (± 3.94)	0.4 (± 2.07) [-1.4 to 2.2]	
Playing	Control	6.8 (± 2.17)	6.6 (± 2.07)	-0.2 (± 1.48) [-1.5 to 1.1]	-0.63
	Treatment	8.0 (± 1.87)	7.0 (± 2.24)	-1.0 (± 1.00) [-1.9 to -0.1]	
Setting healthful goals as a family	Control	5.6 (± 2.51)	5.6 (± 2.88)	0.0 (± 0.71) [-0.6 to 0.6]	0.42
	Treatment	6.0 (± 0.71)	6.4 (± 0.89)	0.4 (± 1.14) [-0.6 to 1.4]	
Adult					
Cooking, eating, and playing together	Control	51.8 (± 5.89)	48.2 (± 5.81)	-3.6 (± 2.79) [-6.0 to -1.2]	3.47
	Treatment	52.0 (± 6.56)	58.8 (± 4.76)	6.8 (± 3.19) [4.0 to 9.6]	
Kitchen proficiency	Control	31.4 (± 9.32)	29.2 (± 7.43)	-2.2 (± 2.86) [-4.7 to 0.3]	4.95
	Treatment	33.6 (± 4.56)	43.0 (± 3.32)	9.4 (± 1.67) [7.9 to 10.9]	
Food security score	Control	2.2 (± 2.28)	2.2 (± 2.28)	0.0 (± 0.0) [0.0 to 0.0]	-1.03
	Treatment	1.8 (± 1.30)	1.0 (± 1.23)	-0.8 (± 1.10) [-1.8 to 0.2]	

SD indicates standard deviation
CI indicates confidence interval
Cohen's d effect size: 0.2 small; 0.5 medium; 0.8 large

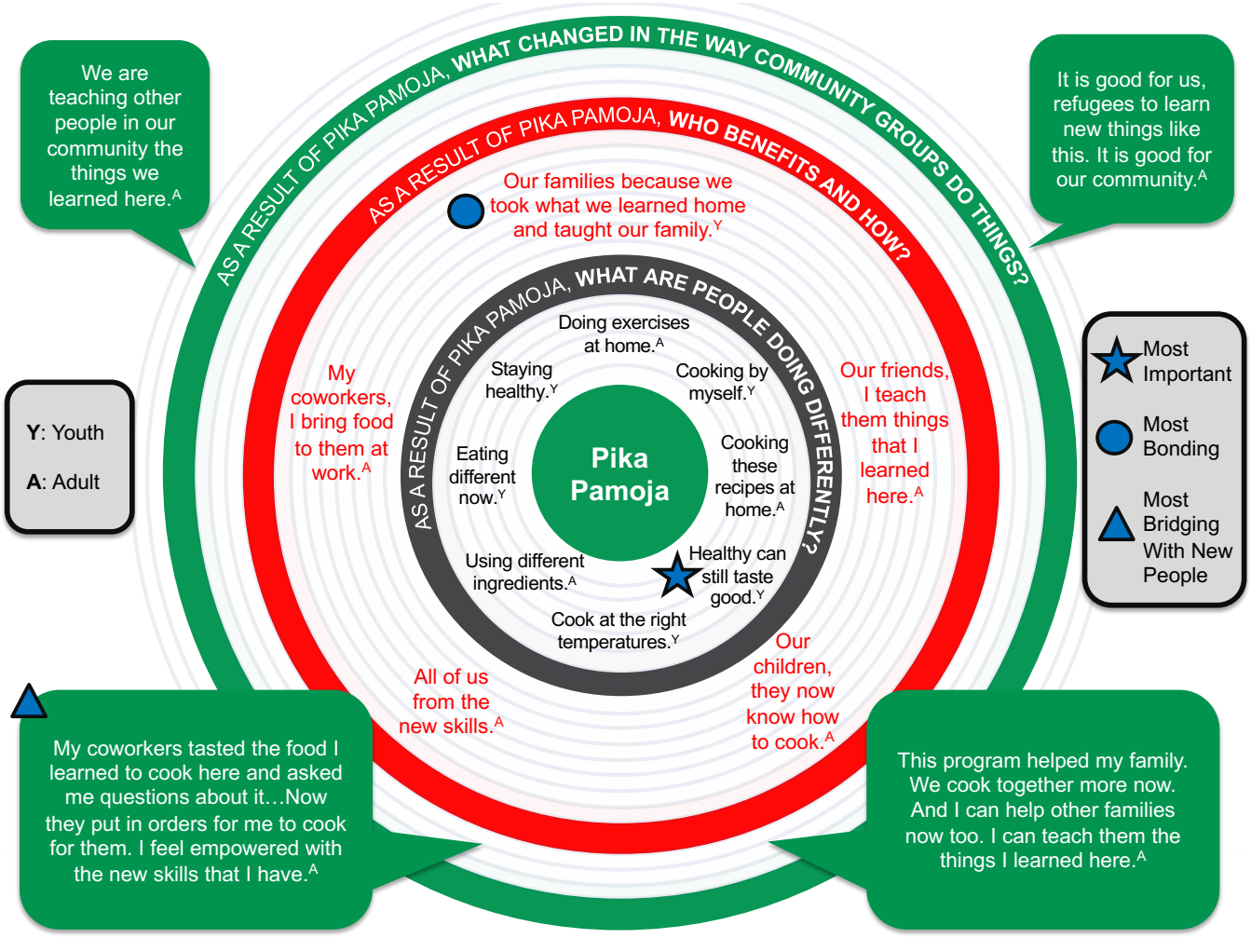

Figure 4.1 *Pika Pamoja* Ripple Effect Mapping results

people. Treatment participants perceived learning that healthy foods can still taste good was the most important take away from *Pika Pamoja*. Participants also perceived that *Pika Pamoja* had an impact on their familial bonding, expressing that they took the skills and knowledge gained in the program back home to their other family members. Additionally, treatment participants perceived that their cooking knowledge and skills gained from *Pika Pamoja* helped to bridge new social connections with coworkers.

Discussion

Researchers have long recognized the need for culturally appropriate interventions to promote better health outcomes and program acceptance among diverse, underserved populations.[33-36] However, similar to iCook 4-H,[1,2] the development and testing of many evidence-based nutrition interventions require numerous years of funding and other resources. Although this is necessary to ensure that original nutrition interventions are high quality and evidence-based, funding streams are limited and some underserved populations, such as refugees, are not reached by these interventions. Directing efforts to cultural adaptation of existing evidence-based nutrition interventions, like iCook 4-H, may help mitigate this lack of refugee-specific curricula.

Based on the results of this study, *Pika Pamoja*, a community-based culturally adapted cooking curriculum,[23] was found to be feasible to implement and evaluate, and appeared to be accepted by the Burundian and Congolese refugee families who participated in the study. Although not originally designed to focus on improving household food security, the original cooking, eating, and playing together constructs from the iCook 4-H program[2] provided an appropriate foundation to address the unique dietary acculturation barriers[8] to food security among the targeted community. For example, the healthful cooking using low cost recipes, social network support through the group setting design, and the communal transfer of knowledge and skills between youth and adults through the dyad model were important components of the original

cooking curriculum. Through the cultural adaptation process, content was added to address additional dietary acculturation barriers to food security identified by the priority population. This included navigation of public transportation to food outlets, using US currency for food purchases, and applying and using US Department of Agriculture nutrition assistance programs.[8] Identifying evidence-based nutrition interventions that are feasible and acceptable to culturally adapt is particularly important for refugee communities who arrive from diverse countries, experience diverse historical trauma, and live in diverse US cities. The funding and time needed to develop a new program for each refugee community is not feasible; therefore, focusing resources on adapting and then testing existing, evidence-based interventions is warranted to better serve vulnerable refugee communities.

Pika Pamoja evaluation data were uniformly positive, but results highlighted some important considerations for future larger scale studies. For example, attrition was not an issue in this pilot, but session attendance varied, especially among adult participants. Working directly with the refugee community to better understand typical work schedules and how they may influence intervention implementation is needed. Additionally, some flexibility in attendance requirements, including number of required sessions and allowance of other family member participation, should be considered when working with Burundian and Congolese refugee families. Moreover, limited time was an issue noted by researchers, facilitators, and participants. In future studies to test *Pika Pamoja*, researchers should consider adding more or lengthening sessions to increase the allotted time for each activity, and account for late participant arrivals and time needed for interpretation. Lastly, although one item was deleted from both the youth and adult pre- and post-intervention survey instrument to achieve the optimum Cronbach's alpha in this study, the small sample size warrants use of the full instrument,[27] with the need for cognitive interviews, prior to future larger scale studies.

Although control group contamination was a possible threat to internal validity in this study because of a small community of refugees who were likely to interact outside of the study,[32] triangulation of evaluators and evaluations provided a strong overall understanding of feasibility and acceptability of implementation and evaluation. This

triangulation of various data collection methods and multiple data sources also helps to increase accuracy of findings and decrease potential biases posed by the single coder analysis in this study.[32] However, close community relationships may pose threats to examining differences between groups with traditional randomization in future effectiveness trials of *Pika Pamoja*. Alternatively, cluster randomization could be used to test the effect of the intervention on food security among refugee communities, where the chance of contamination is high.[32] Lastly, both the documented communication between control and treatment dyads about the intervention during implementation, and the control group's expressed interest in participating in future interventions may warrant the exploration of a delayed intervention design in future studies among this population.

Conclusion

Based on these results, *Pika Pamoja* was found to be feasible to implement and appeared to be accepted by the priority population. Larger scale studies to measure the effectiveness of *Pika Pamoja* to increase food security among refugee families are needed. Focusing funding and resources on the testing of culturally adapted evidence-based interventions may be a cost-effective way to address the lack of refugee-specific nutrition curricula.

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Conflict of Interest

The authors declare no conflict of interest.

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CHAPTER V: Lessons Learned

Throughout this journey I have learned many lessons professionally and personally. I am incredibly proud of the outcome of this project but learned that the product of the process is sometimes more valuable. This process fostered my skills to synthesize and transfer my knowledge and experiences to produce a more comprehensive research approach. I learned how to combine my passion to work with vulnerable communities with my curiosity and desire for further understanding of their experiences through research.

I knew from previous work how difficult community projects can be. Juggling many moving parts, learning to be flexible and adaptable, and understanding the time needed to build strong relationships were all things I have previously encountered. However, adding the element of research into this equation was initially nerve wrecking. I feared that sticking to strict research protocols in a community-based setting would result in a lack of genuineness. Although the balance was difficult at times, I learned how to conduct quality research while maintaining authentic relationships with the community. In my opinion, the synergy between these elements generated a higher quality product for both the researchers and the community itself.

In addition to all the knowledge and skills I have developed throughout the process, this experience laid a strong foundation to kickstart my future research projects. Although I have a better understanding of some of the concepts explored in this research, the process produced infinite curiosities and questions I am excited to investigate throughout my career. In addition to testing the product of this project in larger scale effectiveness trials, further research is needed to develop valid instruments for measuring dietary acculturation among refugees. Results of this project have also peeked my interest in exploring a positive deviance approach to inform future food security interventions among refugees. Moreover, to promote health equity among the population, a better understanding of refugee experiences with and barriers to accessing nutrition assistance programs is needed to inform future interventions.

Lastly, and most importantly, I learned how to combine my love for research and my passion to serve vulnerable communities. Saving the world can take many forms. For me, I have identified how to use my educational privileges and research skills to

help marginalized groups. Although this work is a drop in a very large bucket, I have realized small steps can lead to a better understanding and increased awareness which will hopefully result in better health outcomes for refugees and similar communities.

CHAPTER VI: Conclusion

The primary aim of this community-based study was to test the feasibility and acceptability of implementing and evaluating an evidence-based cooking curriculum, culturally adapted to address food security and the unique dietary acculturation experiences of Burundian and Congolese refugee families living near a mid-sized city in the Southeastern region of the US. The study was conducted in three major phases:

1. The first phase of this study provided an exploration of the unique dietary acculturation and food security experiences of Burundian and Congolese refugee females resettled in the US. This formative research identified perceived dietary acculturation barriers and facilitators to food security among participants, some consistent with previous research among other refugee groups and others newly documented. This formative work showed the complex and dynamic relationship between factors at various levels of the SEM and demonstrated the need for multi-level interventions to improve food security among refugees. The findings of this study were used to inform a community-based cultural adaptation of an existing, evidence-based cooking curriculum in the next phase of the study.
2. The second phase of this study was designed to adapt an existing, evidence-based cooking curriculum and address the unique dietary acculturation and food security experiences of Burundian and Congolese refugee families living near a mid-sized city in the Southeastern region of the US. A four-phase curriculum adaptation process (information gathering, preliminary adaptation design, pilot testing, and refinement) was applied to the existing evidence-based iCook 4-H curriculum using a five strategy (peripheral, evidential, linguistic, constituent-involving and sociocultural) cultural adaptation framework. The resulting curriculum, *Pika Pamoja* (Cook Together), included 17 adaptations, derived from varying combinations of four data sources (literature review, researcher informed, priority population and steering committee), applying all five cultural adaptation strategies. This study provided a community-based cultural adaptation process that could be adopted with various refugee populations to address dietary acculturation barriers and facilitators to food security.

3. The third phase of this study was designed to test the feasibly and acceptability of implementing and evaluating *Pika Pamoja* for Burundian and Congolese refugee families. Feasibility (recruitment/retention, implementation, fidelity testing, and dyad assessment procedures) and acceptability (process and program evaluations) measures were collected. Based on the results of this study, *Pika Pamoja* was found to be feasible to implement and evaluate (successful recruitment methods and retention, positive facilitator debriefs, high rate of sessions objectives met, and successful dyad assessments), and appeared to be accepted by the Burundian and Congolese refugee families who participated in the study (positive participant feedback on program and evaluation methods).

Pika Pamoja is the first example of community-based cultural adaptation of an evidence-based cooking curriculum to address the unique dietary acculturation and food security experiences of Burundian and Congolese refugees living near a mid-sized city in the Southeastern region of the US. The development and testing of many evidence-based curricula require numerous years of funding and other resources; however, funding streams are limited and some underserved populations, such as refugees, are not reached by these interventions. Directing efforts to cultural adaptation of existing evidence-based curriculum, like iCook 4-H, may help mitigate this lack of refugee-specific curricula. Based on the results of this study, *Pika Pamoja* was found to be feasible to implement and evaluate, and appeared to be accepted by the Burundian and Congolese refugee families who participated in the study. Future, larger scale studies will be conducted to measure the effectiveness of *Pika Pamoja* to increase food security among refugee families.

APPENDICES

Appendix A: Formative Research- Interview Guide

Interviewer Name:

Participant ID:

Date:

Start time:

End time:

Field Notes:

_____
_____
_____

- Tell me about foods you like to eat.
    - What foods do you like from your country?
    - What American foods do you like to eat?
- Tell me about finding foods you like or are familiar with in the United States?
- Tell me about your experience shopping for food in the United States?
    - Why do you choose to shop at certain grocery stores or other food markers for your food?
    - Tell me about your experience buying foods at stores in the United States.

        - Discuss your experiences using money in United States to buy food.

    - Tell me about your experiences with transportation to and from grocery stores or other food markets?

- Discuss your experiences cooking here in the United States?

    - Discuss your experiences with using new cooking methods or tools in the United States.

- Tell me about your experiences with food programs (food stamps, WIC, school lunch, etc.) in the United States?

    [Probe if participant uses or has used a nutrition assistance program]:
    - Tell me about your experiences with signing up for programs?

    - Tell me about your experiences with using program benefits?

- Is there anything else you would like to share with me today?

Appendix B: Formative Research-Demographic Survey

Interviewer Name:

Participant ID:

Date:

Start time:

End time:

Field Notes:

_____
_____
_____

Description	Recorded Responses
I need to ask these questions of everyone, are you male or female?	Male, Female 1 = Male 2 = Female
In what year were you born?	
In what country were you born?	
What race do you identify with?	1 = White 2 = Black 3 = Asian 4 = Hispanic 5 = Native American 6 = Other
"Are you now: 1. Married 2. Living together in a marriage-like relationship but not married 3. Separated 4. Divorced 5. Widowed 6. Never married, not living with someone in a marriage like relationship	1. Married 2. Living together in a marriage-like relationship but not married 3. Separated 4. Divorced 5. Widowed 6. Never married, not living with someone in a marriage like relationship
How many years of schooling in total have you completed?	

Are you working now, temporarily laid off, unemployed and looking for work, unemployed and not looking for work, disabled and unable to work, retired, a homemaker, or student?	Employed for wages, Self-employed, Out of work (looking), Out of work (not looking), Stay at home parent, Student, Retired, Unable to Work
How many adults currently live in your home?	
How many children currently live in your home?	
What is your child's date of birth?	
In what year was your child born?	
I need to ask these questions of everyone, is your child a male or female?	Male, Female 1 = Male 2 = Female
What is your child's race?	1 = White 2 = Black 3 = Asian 4 = Hispanic 5 = Native American 6 = Other
Do you or any members of your family participate in any of the following? Aid to dependent children/TANF, EFNEP, Free/Reduced price school meals, Medicaid, welfare-to-work, WIC, SNAP, Supplemental security income	1 = Yes 2 = No
Using a scale from one to ten where 10 indicates exactly the same and 1 means completely different, how would you compare the similarity in the diet in the food you now normally eat in the United States with the food you normally ate in your home country?	
In what month and year did you first leave (country of origin) to live in the United States?	
Do you have any difficulty understanding people in the United States because of language?	0: No 1: Yes

Appendix C: Steering Committee Demographic Survey

Participant ID:

Date:

Please answer the following questions to the best of your ability.

1. What sex do you identify with?
   - ☐ Male
   - ☐ Female
   - ☐ Other

2. In what year were you born? _____

3. In what country were you born?

4. What race do you identify with?
   - ☐ White
   - ☐ Black
   - ☐ Asian
   - ☐ Hispanic/Latino(a)
   - ☐ Native American
   - ☐ Other

5. Are you currently:
   - ☐ Married
   - ☐ Single
   - ☐ Separated
   - ☐ Divorced
   - ☐ Widowed

6. How many years of schooling in total have you completed? _____

7. Are you currently:
   - ☐ Employed for wages
   - ☐ Self employed
   - ☐ Out of work (looking)
   - ☐ Out of work (not looking)
   - ☐ Stay at home parent
   - ☐ Student
   - ☐ Retired
   - ☐ Unable to work

8. How many adults currently live in your home? _____

9. How many children currently live in your home? _____

10. In what month and year did you move to the United States? _____

11. Do you have any difficulty understanding people in the United States because of language?

- ☐ Yes
- ☐ No

Appendix D: Curriculum Adaptation Evaluation Tool

Instructions for Use:

The following evaluation tool is to be used to review each of the provided cooking sessions. You will complete this evaluation prior to the next scheduled steering committee meeting and be prepared to discuss any suggestions or feedback at that meeting.

After completing this form, please return this form to Marissa McElrone, the PI of the study in person or via email at mcelrone@vols.utk.edu.

To complete this evaluation you will need:

- The class specific leader guide (The PI will provide)
-

General Information

Evaluator name:

Date of evaluation:

Name of the lesson:

When reviewing this lesson, consider each of the questions below and reflect your recommendations for curriculum adaptation in the chart below for each activity/topic covered in the lesson:

- What should this activity/topic be named to be more relevant to priority population?
- What images should be included to reflect the priority population?
- What program materials should be included/changed to be more relevant to the priority population?
- What other relevant topics should be included in this activity/topic area?
- What types of foods/recipes should be added/changed?
- What else needs to be considered to make this lesson more culturally and linguistically relevant to the priority population?

Activity/Topic	Content	Recommendations for Adaptation
Activity/Topic x	What should this activity/topic be named to be more relevant to priority population?	
	What images should be included to reflect the priority population?	
	What program materials should be included/changed to be more relevant to the priority population?	
	What other relevant topics should be included in this activity/topic area?	
	What types of foods/recipes should be added/changed?	
	What else needs to be considered to make this lesson more culturally and linguistically relevant to the priority population?	

Appendix E: Pilot Test-Fidelity Testing Tool

FIDELITY OF IMPLEMENTATION INSTRUMENT

Preparation Instructions: For Fidelity Observer

Review training materials on the eXtension Moodle Campus site for conducting fidelity of implementation testing. Monitor the session as an observer. Complete the form below documenting attendance, timing of activities, leader effectiveness and participants' engagement in the session. To complete this evaluation you will need:

- The session-specific leader guide
- A timing device, like a stopwatch or cell phone

General Information

Evaluator Name: _____

State: _____ Site Location: _____ Session Leader: _____

Number of Youth Present: _____ Number of Youth Expected: _____

Number of Adults Present: _____ Number of Adults Expected: _____

Expected Session Start Time: _____ Actual Session Start Time: _____

Expected Session End Time: _____ Actual Session End Time: _____

Objectives

1. What was the actual time of each of the following activities?

	Allotted (min)	Actual (min)
Getting Started		
Intro Activity (if applicable)		
Physical Activity		
Cooking Skills and Recipe		
Family Communication		
Goal Setting		
Summary and Reminders		

FIDELITY OF IMPLEMENTATION INSTRUMENT

Circle the option below for questions 2-4 that best represents what happened during the session.

2. In general, how interested were the adults in the session?

Showed little engagement in the session
Were somewhat engaged in the session
Were engaged in the session
Were actively engaged throughout the session

3. In general, how interested were the youth in the session?

Showed little engagement in the session
Were somewhat engaged in the session
Were engaged in the session
Were actively engaged throughout the session

4. In general, how effective was the leader in the session?

Very ineffective
Ineffective
Effective
Very Effective

Questions 5-7 ask about leader resources. Circle the option below that best represents what you observed.

5. How much did the leader refer to the leader guide/materials throughout the session?

Unobserved
Never
Rarely
Sometimes
Most of the time
Always

6. Were there adequate materials for the leader to teach the session?

Not adequate
Moderately adequate
Adequate

FIDELITY OF IMPLEMENTATION INSTRUMENT

7. If materials were inadequate or missing, please list:

_____

_____

_____

8. Check whether the following session objectives were met.

_____Youth and adults cooking together

_____Youth practicing culinary skills

_____Youth and adults playing together

_____Youth and adults eating together

_____Youth and adults engaged and communicating

_____Youth-adult goal setting

Appendix F: Pilot Test-Adult Demographic Survey

Interviewer Name:

Participant ID:

Date:

Start time:

End time:

Field Notes:

_____
_____
_____

Description	Recorded Responses
Baseline Only	
I need to ask these questions of everyone, are you male or female?	Male, Female 1 = Male 2 = Female
In what year were you born?	
In what country were you born?	
What race do you identify with?	1 = White 2 = Black 3 = Asian 4 = Hispanic 5 = Native American 6 = Other
"Are you now: 7. Married 8. Living together in a marriage-like relationship but not married 9. Separated 10. Divorced 11. Widowed 12. Never married, not living with someone in a marriage like relationship	7. Married 8. Living together in a marriage-like relationship but not married 9. Separated 10. Divorced 11. Widowed 12. Never married, not living with someone in a marriage like relationship
How many years of schooling in total have you completed?	

Are you working now, temporarily laid off, unemployed and looking for work, unemployed and not looking for work, disabled and unable to work, retired, a homemaker, or student?	Employed for wages, Self-employed, Out of work (looking), Out of work (not looking), Stay at home parent, Student, Retired, Unable to Work
What is your relationship to the child in the study? Parent, Grandparent, or other?	Parent, Grandparent, Other
How many adults currently live in your home?	
How many children currently live in your home?	
What is your child's date of birth?	
In what year was your child born?	
I need to ask these questions of everyone, is your child a male or female?	Male, Female 1 = Male 2 = Female
What is your child's race?	1 = White 2 = Black 3 = Asian 4 = Hispanic 5 = Native American 6 = Other

Description	Recorded Responses
Pre- and Post-intervention	
In the last 2 months, the food that I bought just didn't last, and I didn't have money to get more. Would you say that is often true, sometimes true, or never true for your household?	1 = Often True 2 = Sometimes True 3 = Never True
I couldn't afford to eat balanced meals in the last 2 months. Would you say that is often true, sometimes true, or never true for your household?	1 = Often True 2 = Sometimes True 3 = Never True
In the last 2 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	1 = Yes 2 = No
If Yes is selected to foodsecurity3, how often did this happen? Would you say	1 = Almost every month 2 = Some months, but not every month

almost every month, some months but not every month, or only 1 or 2 months?	3 = Only 1 or 2 months
In the last 2 months, did you every eat less than you felt you should because there wasn't enough money for food?	1 = Yes 2 = No
In the last 2 months, were you ever hungry but didn't eat because there wasn't enough money for food?	1 = Yes 2 = No
Do you or any members of your family participate in any of the following? Aid to dependent children/TANF, EFNEP, Free/Reduced price school meals, Medicaid, welfare-to-work, WIC, SNAP, Supplemental security income	1 = Yes 2 = No
Using a scale from one to ten where 10 indicates exactly the same and 1 means completely different, how would you compare the similarity in the diet in the food you now normally eat in the United States with the food you normally ate in your home country?	
In what month and year did you first leave (country of origin) to live in the United States?	
Do you have any difficulty understanding people in the United States because of language?	0: No 1: Yes
Is it difficult to shop here because you don’t know all the different foods in stores?	0 = No 1 = Yes
Do you usually cook foods from your home country because you don’t know how to make American foods?	0 = No 1 = Yes
Do you shop where you do because you do not know where other stores are?	0 = No 1 = Yes
Is it difficult to find store with foods you like?	0 = No 1 = Yes

1) Tell me about a time, in the last 2 months, you did not have enough food to feed your whole family.

[*Prompts for elaboration]:*

Can you tell me more about that?

What do you mean by that?

[If participant expresses that they have experienced the situation described above in the last 2 months ask question 2 below.]

2.) What do you do when you don't have enough food, and don't have enough money to buy food?

[*Prompts for elaboration]:*

Can you tell me more about that?

What do you mean by that?

Appendix G: Pilot Test-Adult Program Evaluation Survey

ADULT SURVEY

Think about the recent past. Circle the answer that best defines how often you do each of the following questions.

1. How often do you plan meals ahead of time?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

2. How often do you compare prices before you buy food?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

3. How often do you run out of food before the end of the month?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

4. How often do you shop with a grocery list?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

5. This question is about meat and dairy foods. How often do you let these foods sit out for more than two hours?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

6. How often do you thaw frozen food at room temperature?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

7. When deciding what to feed your family, how often do you think about healthy food choices?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

ADULT SURVEY

8. How often have you prepared foods without adding salt?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

9. How often do you use the "Nutrition Facts" on the food label to make food choices?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

10. How often do your children eat something in the morning within two hours of waking up?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

11. Are you active on 4 or more days a week?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

12. How often do you shop with a grocery list?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

13. How often do you plan your weekly meals?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

14. How often does your child help you cook meals?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

15. How often do you enjoy making meals with your child?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

16. How often does your child help in meal planning?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

17. How often do you enjoy making meals?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

18. How often does your child help you shop for groceries?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

19. How often would you rather eat out than make the evening meal?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

20. How often do you feel confident with your kitchen skills?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

21. How often does your family eat together each week?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

22. How often do you make eating together as a family a priority?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

23. How often do topics of conversations at mealtimes include all family members?
1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

24. When you think about each day of the week, how often is your child physically active for at least 60 minutes each day?

1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

25. When you think about each day of the week, how often are you physically active for at least 30 minutes each day?

1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

26. How often does your family actively play together?

1. Never
2. Rarely
3. Sometimes
4. Most of the time
5. Always

Session Leader Information for Scoring Program Evaluation

Instrument Scoring

- **Extension Behavior Checklist:** items 1-11; scoring 5=always, 4=most of the time; 3=sometimes; 2=rarely; 1=never. Add items 1-4 together for Food Resource Management; add items 5-6 together for Food Safety, and add 7-10 together for Nutrition Practices. All three subscores address "Kitchen Proficiency"
- **Physical Activity:** Item 11 is a single item about physical activity.
- **Cooking, Eating, and Playing Together:** Add Items 12-26 using scoring 5=always, 4=most of the time; 3=sometimes; 2=rarely; 1=never to address "Cooking, Eating and Playing Together". Score range=15-75.

Appendix H: Pilot Test-Youth Program Evaluation Survey

YOUTH SURVEY

Answer the following questions by thinking about if you know how to do what is asked. If you can do what is asked, circle how often you do that. For example, can you use a strainer, ALL THE TIME, OFTEN, SOMETIMES, or RARELY? If you can NOT use a strainer, circle NEVER for that question.

1. Can you use a knife to cut foods?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

2. Can you use an oven for cooking?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

3. Can you use a stovetop for cooking?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

4. Can you use a blender?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

5. Can you cook foods to the right temperature?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

6. Can you store foods the right way?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

7. Can you measure ingredients for a recipe?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

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8. Can you use herbs and spices when cooking?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

Answer the following questions by thinking about how willing you are to do what is asked.

9. How willing are you to taste new foods you have not tried?
1. Very Unwilling
2. Somewhat Unwilling
3. Neither Unwilling nor Willing
4. Somewhat Willing
5. Very Willing

10. How willing are you to cook new foods that you have not tried?
1. Very Unwilling
2. Somewhat Unwilling
3. Neither Unwilling nor Willing
4. Somewhat Willing
5. Very Willing

11. How willing are you to try foods in new and interesting ways?
1. Very Unwilling
2. Somewhat Unwilling
3. Neither Unwilling nor Willing
4. Somewhat Willing
5. Very Willing

Answer the following questions by thinking about the DOUBT you have that you can do what is asked. If you have no doubt you can do what is asked, then you agree with the statement. If you doubt you can do what is asked, then you disagree with the statement.

12. I am sure I can cook.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

13. I am sure I can follow a recipe.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

14. I am sure I can use a knife safely.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

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15. I am sure I can use an oven.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

16. I am sure I can use a stovetop.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

17. I am sure I can make food safely to avoid getting sick.
1. Strongly Agree
2. Agree
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree

Answer the following questions, by thinking about how OFTEN you do what is asked.

18. How often do you help your parents shop for groceries?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

19. How often does your family eat together?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

20. How often do you help cook meals for your family?
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

21. How often do you eat with your family at a table without distractions? (TV, cell phones)
1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

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YOUTH SURVEY

22. When you think about each day of the week, how often are you physically active for at least 60 minutes each day?

1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

23. When you think about each day of the week, how often does your heart pump hard and you sweat when you are being physically active?

1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

24. How often does your family play together?

1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

25. How often do you set healthy goals for yourself?

1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

26. How often do you meet your healthy goals?

1. Never
2. Rarely
3. Sometimes
4. Often
5. All of the Time

Session Leader Information for Scoring Program Evaluation

Scoring (n=26 total items; scores computed by adding up scores on the 6 individual scales below; score range 26-130)

- Cooking skills: items 1-8; 5-all the time, 4=often; 3=sometimes; 2=rarely; 1=never; point range= 8-40
- Openness to new foods: items 9-11; 5=very willing; 4=somewhat willing; 3=neither unwilling nor willing; 1=very unwilling; point range=3-15
- Culinary self-efficacy: items 12-17; reverse code 5=strongly agree; 4=agree; 3=neither agree nor disagree; 2=disagree; 1=strongly agree; point range=6-30
- Togetherness with food: items 18-21; 5-all the time, 4=often; 3=sometimes; 2=rarely; 1=never; point range= 4-20
- Physical activity: items 22-24; 5-all the time, 4=often; 3=sometimes; 2=rarely; 1=never; point range= 3-15
- Goal setting: items 25-26; 5-all the time, 4=often; 3=sometimes; 2=rarely; 1=never; point range= 2-10

Appendix I: Pilot Test-Session Process Evaluation And Facilitator Debriefing Tool

Instructions for Use:

The following session debriefing tool is to be used by facilitators at the completion of each session.

1. After completing the session, complete the process evaluation questions below with the participants (both adult and youth) in a group setting. Record participant responses in the table below.
2. Immediately after participants leave, complete the facilitator debrief questions below (together is there is more than one facilitator). Complete each set of facilitators debrief questions for **each** activity/topic in the session.

Session	Who	Debrief Question	Responses
Session x	Participants	What did you like in the session?	
		What did you not like in the session?	
		Is there anything else that needs to be considered or that should be added in this session?	
	Facilitator(s)	What did you not like in the session?	
		Is there anything else that needs to be considered or that should be added in this session?	
		Where the participants (adult and youth) engaged in this activity/topic?	
		Was the allotted time appropriate for the activity/topic?	
		Did you feel comfortable teaching the activity/topic?	
		Is there anything else that needs to be considered for this activity/topic?	

VITA

Marissa McElrone was born in Easton, Pennsylvania where she also attended elementary, middle and high school graduating from Notre Dame High School in 2006. In the fall of 2006, Marissa began her education in Nutrition at Penn State University in State College, Pennsylvania. In December 2009 she graduated from Penn State University with a Bachelor of Science in Nutritional Sciences. After college, Marissa moved to Providence, Rhode Island where she work as a Minority Health Promotion Coordinator at a local nonprofit and later as a Nutritionist for the Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC). In fall of 2011 Marissa started her tenure as a United States Peace Corps Volunteer in Tanzania, East Africa where she primarily focused on maternal and child nutrition health projects in her rural village for over two years. After returning to the United States, Marissa worked again as a WIC Nutritionist in Allentown, Pennsylvania. In fall 2015, she moved to Knoxville, Tennessee to begin her graduate studies at the University of Tennessee, Knoxville. Here, she completed both her Dietetic Internship, making her eligible for Registered Dietitian credentials, and her Doctorate of Philosophy in Nutritional Sciences focusing on Community Nutrition.